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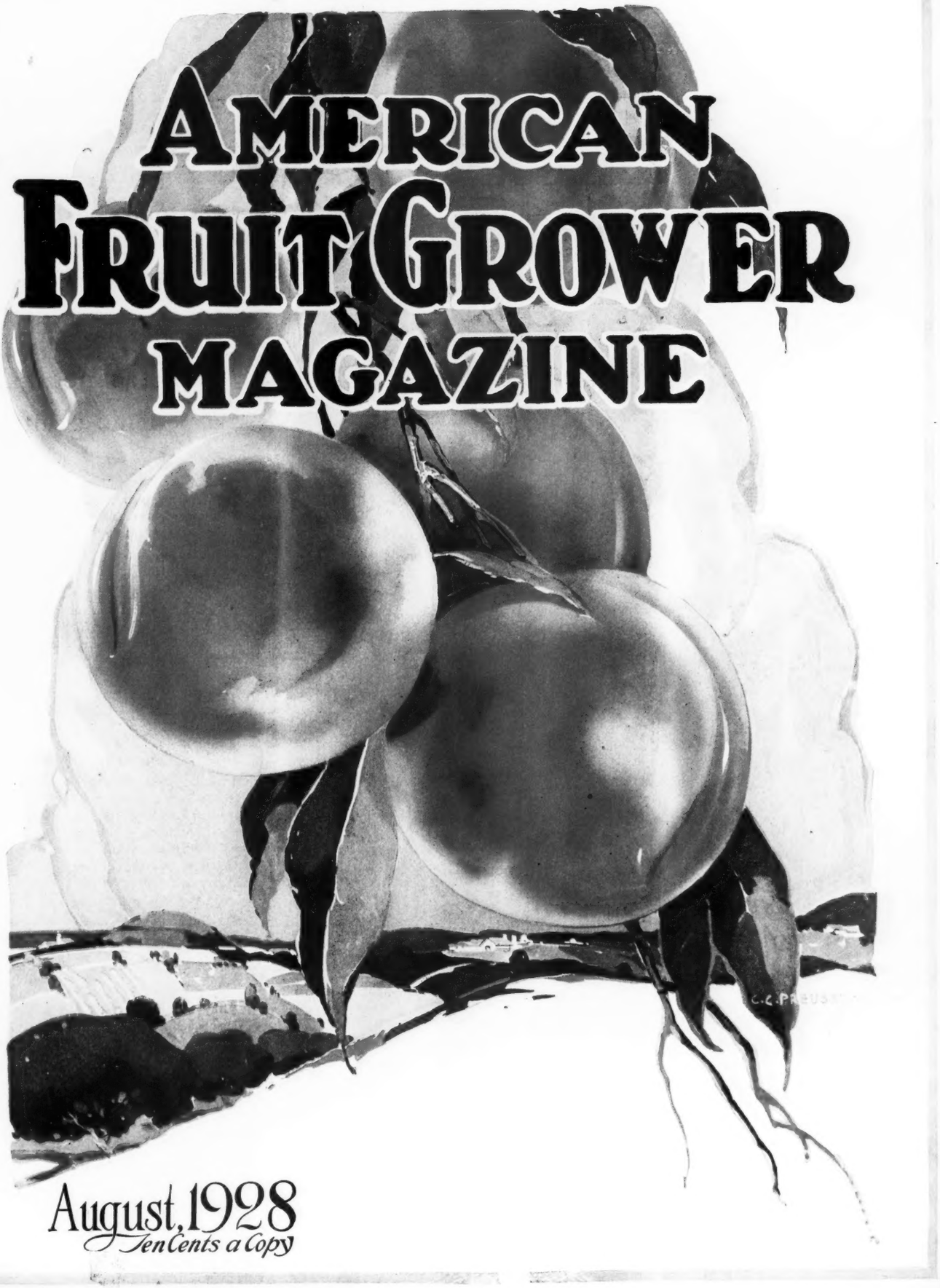

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COOL AIR STORAGE for APPLES

This modern appearing fruit packing house and air cooled storage plant was remodeled from an old pin-frame construction barn. The expense was only a fraction of what would have been required for entirely new construction.

The Present Prospects for a Generally Good Apple Crop Brings the Subject of Farm Storage Facilities to the Front. Whether the Storage House is to be Newly Built or an Existing Building is to be Remodeled for Storage, the Two Important Points to be Considered Are Insulation and Ventilation. Of These Two, Insulation is the Most Vitally Important Point.

By J. W. Farnsworth

W. G. Farnsworth Orchards, Inc., Ohio

AMONG the many factors that go to determine the final net profit on a crop of apples, about the only variable factor over which growers have any control is the cost of production. It was in trying to reduce this cost that we decided two years ago to build a cool air storage on the farm. The first great saving from this storage has come in reducing the direct cost of storage from ten cents per bushel for the first month to six cents per bushel for the entire season. The second saving came through the more efficient use of labor,—by delaying the packing until all the fruit was picked and stored and then using the same labor to pack during the winter months. Not only is this a saving in the cost of labor but the work done is much more satisfactory when it is possible to give proper supervision of regular help. This is not generally possible in the rush season when the picking, packing and shipping are done simultaneously. Newly packed fruit will nearly always sell to advantage over fruit packed before storing. Any loss (which so far has been very small) is taken before the fruit leaves the farm, insuring to the consumer a product that is uniform and dependable.

Our storage was built at comparatively small cost by remodeling an old barn for which we had no more use. The barn was of pin-frame construction, 40 feet wide by 125 feet long. The posts and beams were 8 by 8 inches, with a ten-foot ceiling over the south 70 feet; the north 50 feet having a basement under the first floor which was three feet above the level of the ground and above the floor of the south 70 feet. The north 50 feet, above the basement, we use for packing room; with an office in one corner and all of it heated by a hot water heating system operating from the office. On the west side of the packing room are folding sliding doors that give a fifteen foot opening to a covered receiving dock on a level with the bed of wagons and trucks. The upper part of the entire building, originally used for hay, we now use for storage of baskets and supplies, having room for some twenty-five cars. The south seventy feet of the building is used for fruit storage only, and has a capacity of ten thousand bushels in crates. The basement under the north fifty feet is used only for temporary storage. Because of the warm ground temperature in the fall it is impossible to lower the temperature sufficiently, even with plenty of ventilation.

Insulation was the first factor considered in remodeling. On the outside of the building we nailed to the barn siding two layers of waterproof building paper. This paper provides some insulation against heat and cold but chiefly against moisture. Over the two layers of building paper we nailed stucco steel fabric to which we applied an inch of waterproof Portland cement stucco. On the inside we built out flush to the eight by eight beams and posts with two by twos, spacing them sixteen inches apart. To this framework we nailed composition insulating board, applying from the bottom and filling the space between it and the barn siding with tightly packed, dry planer shavings. To prevent moisture from coming up from the foundation we covered the plate with tar and mixed dry sulphur with the first two feet of shavings to prevent mildew. This gave us a wall of: one inch of stucco, two layers of building paper, one inch of barn siding, eight inches of planer shavings, and ¾ inch of composition board, or a wall equivalent to seven inches of cork in insulating value. The ceiling was insulated by filling in between the joists with the shavings.

The subject of insulating materials for walls is too broad to go into detail. Most materials are dependent on dryness for their efficiency (*To Page* 21)

(Above.) Four truck loads of honey bees loaded for an eighty-mile journey to the apiary of C. J. Freeman, Mesick, Michigan. These 200 colonies gathered three tons of honey in eleven days while distributed in the W. R. Roach Orchards, Hart, Michigan.

BUSY HONEY BEES Bring LOADED TREES

The Results from Extended Experiments in Pollination Develope a New Industry—Renting Colonies of Honey Bees to Fruit Growers. The Results of This Type of "Super-Pollination" Were Especially Noticeable in Michigan Sour Cherry Orchards.

By H. D. Hootman

Michigan State College

THE possibility of using bees to increase yields in sour cherry orchards is a question that only recently has had the attention of fruit growers. The Montmorency sour cherry is generally considered self-fertile, its blossoms being capable of developing into fruit when fertilized with the pollen produced on its own stamens. The need of plenty of honey bees or wild insects in sour cherry orchards during the blossoming season to pollinate the blossoms has not long been appreciated.

In the spring of 1927 a wire screen cage was built around a Montmorency cherry tree, in the Michigan State College orchard at East Lansing; to exclude all insects during the blossoming season. A severe freeze previous to the blooming season injured many of the buds so that their development into fruit was impossible.

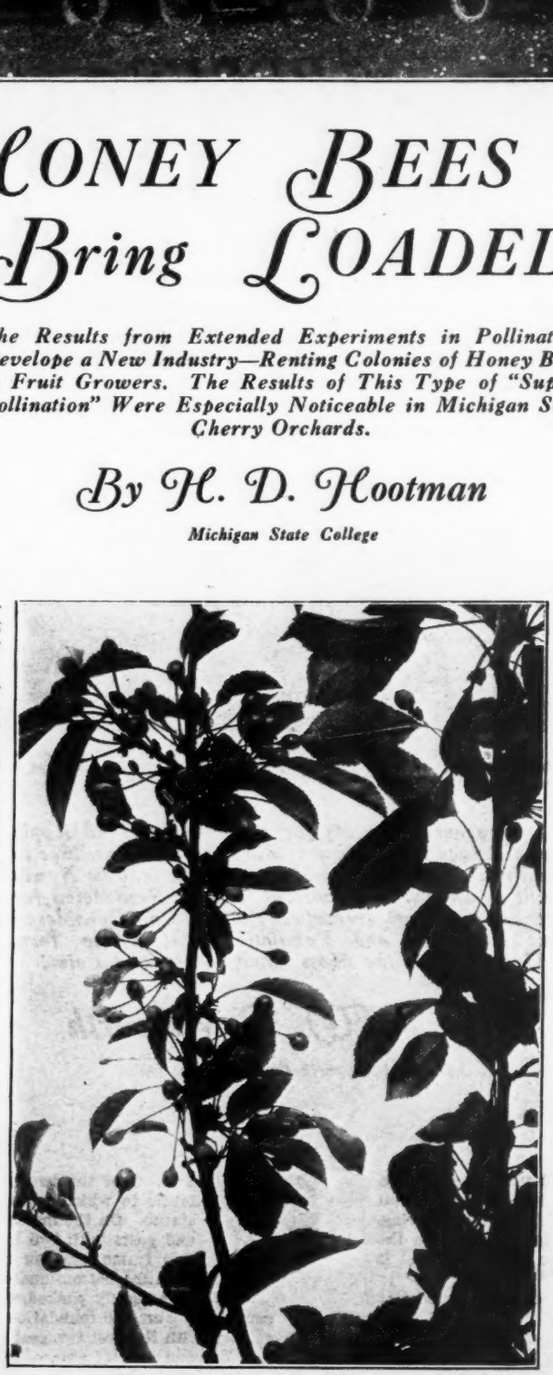
One warm sunny day during blossoming, a man entered the cage and with a small brush hand pollinated the live blossoms on a single large limb—doing the work of the bee—distributing the pollen from the stamens to the sticky stigmas. At harvest time it appeared that all the cherries were on this limb. Forty-nine per cent of the live blossoms on the hand pollinated limb set fruit; while the balance of the tree, subject only to wind pollination, set 4% of its live blossoms.

This data along with field observations indicated that sour cherry yields in some orchards might be measurably increased by providing plenty of insects at blossom time.

On the morning of May 18, 1928, four truck loads of bees arrived at the W. R. Roach Company orchards located at Hart, Michigan. They had been trucked eighty miles the night previous from the C. J. Freeman Apiary at Mesick.

The 200 colonies were distributed in the 150 acres of apple and cherry orchards with the idea of utilizing for pollination purposes any flights that were made. Where the trees were very large as many as three colonies were distributed on a single acre. In blocks where the trees were seven or eight years of age only one colony to three or four acres of orchards was used. The colonies remained in the orchard eleven days. Weather conditions during this period were not any too favorable for bees to work but in this limited time the 200 colonies gathered three tons of honey—an average of 30 pounds per colony. Further, the cherry crop in the Roach orchards is one of the heaviest in the state.

To check up on what might be accomplished by the bees the Roach Company, of their own accord screened an individual Montmorency cherry tree to exclude all bees. Present indications are that this tree will produce about three pounds of cherries while others bee-pollinated standing 20 feet away will harvest 100 pounds.



BEE POLLINATED. WIND POLLINATED

The branch at the right is from a Montmorency sour cherry tree that was caged during the blossoming season to exclude bees. The crop is estimated at three pounds.

The branch at the left was cut from a bee pollinated tree adjoining the caged tree and will pick 100 pounds.

It has long been known that flowers secrete nectar for the sake of attracting insects, but it is doubtful if the real value of the sour cherry as a honey plant has been appreciated by bee keepers.

The rapid growth and development of the cherry industry is one of the revelations of Michigan horticulture. An indication of the growth and development of the cherry business is reflected by the number of Dunkley cherry pitters used in the state.

In 1917 there were 11 pitters used in Michigan, in 1918 15, 1919 23, 1920 57, 1921 55, 1922 77, 1923 89, 1924 96, 1925 85, 1926 107, 1927 145. Apparently the number that will be required this year will exceed that of any previous year.

The sour cherry probably lends itself as a plant for honey production the best of any of our tree fruits. Apples and pears are subject to the attacks of scab and must be sprayed previous to blossoming. Sour cherries are generally not sprayed until after blossoming. This makes it possible for bee keepers to rent their colonies in concentrated cherry sections, gather the nectar flow available and at the close of the blossoming period move their colonies to other honey producing sections—thus eliminating the hazard of arsenical poisoning to the bees.

The Michigan Fruit Belt extends from Benton Harbor along the eastern shore of Lake Michigan to Traverse City. The differences in the time of blossoming of the various fruit sections, due to their geographical location make it possible for bees to be rented for pollination purposes in at least two different sections the same year. For instance: sour cherries were in full bloom at Benton Harbor the week of May 6 to 13, while at Hart, 130 miles farther north, blossoms did not start to open until May 16.

Bee keepers living within reach of fruit growing sections will do well to anticipate next season's demand for bees for pollination purpose. A closer cooperation between bee keepers and fruit growers is sure to be beneficial to all parties concerned. The results from the wide spread use of bees in orchards this year indicate that the demand for bees next May will exceed the supply. The honey bee is now very generally recognized as being necessary to fruit production.

PROTECT Your PEACH ORCHARD Against the BORER.

By Oliver J. Snapp
U. S. Department of Agriculture

Paradichlorobenzene is Effective Against the Peach Borer If Applied at the Right Time and in the Correct Manner. The Approved Procedure in the Principal Peach Producing Sections

THE peach borer has been one of the most serious insect pests attacking peach trees east of the Rocky Mountains since the time of the early settlers. Each year it directly or indirectly causes the death of many peach trees in both home and commercial orchards. It is a native American insect attacking chiefly the peach, although it is sometimes a serious pest of cultivated plum trees, and has been found breeding in wild plum bushes along the road-side. Peach trees of all ages are attacked and frequently trees are found to be infested the first year after they are set in the orchard. The injury is done by the larvae, or borers, as they feed on the cambium or growing tissues of the tree (Fig. 1). Young trees are sometimes completely girdled by the insect, and while older trees are less liable to be completely girdled, they are often so severely injured that their vitality is materially lowered and their resistance to other insects or diseases reduced to such an extent that some secondary pest will complete the destruction of the tree. Peach borer injury usually takes place on the trunk just below the surface of the soil, although sometimes injury may be found on the trunk just above the soil level. The larger roots are sometimes subject to borer attacks. The presence of borers in a peach tree is usually indicated by gum, particles of wood, and frass (Fig. 3).

Figure 1. Peach tree severely injured by the peach borer.

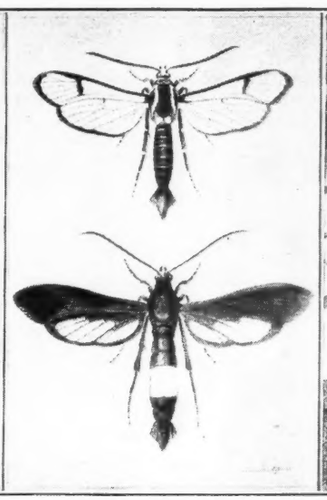


Figure 2. Peach borer adults. Male above, female below.

Figure 3. Gum, etc., at base of tree shows borers present.

For many years entomologists endeavored to find an effective control measure for this insect. These efforts were almost entirely in vain until a few years ago when the use of paradichlorobenzene for its control was discovered. Previous to that discovery the laborious and only partially effective method of removing the borer with a worming knife in the fall of the year was resorted to by most peach growers. When properly used at the right time, paradichlorobenzene gives a high rate of control, and as a result the peach borer problem has been practically solved. There are few, if any, other insecticides which have been brought to the attention of fruit growers, gardeners, and farmers during the last decade that gives as high a rate of effectiveness in controlling insects as does paradichlorobenzene when used against the pernicious peach borer.

Figure 4. Trees that are to be wormed should be mounded during the summer.

Life History and Habits

During its period of development, the peach borer passes through four stages; namely, the egg, larva or borer, pupa, and adult or moth stage. The adult of the peach borer is a clear-wing moth. The female (Fig. 2) is noticeably different in color markings from the male (Fig. 2), and is usually larger and more robust. The color of the female is dark steel-blue, with one or two orange bands around the abdomen. The fore wings of the female are opaque, while the hind wings are clear except for the margins. In the male both sets of wings are clear. The male is a lighter steel-blue in color than the female, and has several narrow bands around the abdomen. The egg of the peach borer is of a reddish-brown color, has one end broader than the other, and measures about 1/50 of an inch in length. The larva, or borer (Fig. 1), when full grown, measures about one inch in length, is of a yellowish white or cream color, and has a dark brown head. The color of the food eaten by the larva will sometimes cause its color to vary. The pupa is of a dark brown color and measures about ¾ of an inch in length. There are stiff spines over the back and sides of the pupa that assist the moth in escaping from the cocoon when it is ready to emerge.

The winter is passed in the larva, or borer, stage, the younger ones living in a more or less dormant condition throughout the winter in a covering constructed on the bark of the tree outside of the burrow, whereas the larger ones pass the winter within their burrows in the bark of the tree, and feed to some extent during warm periods of the winter months. In the Gulf States the first larvae reach maturity during the latter part of June, when they construct silken capsule-like cocoons into which have been woven particles of wood, excrement, etc., giving them a brown color. In this capsule-like cocoon, which is usually found near the surface of the soil, either at the head of the borer gallery or in the soil close to the trunk, the full grown larva changes to a pupa.

(*To Page* 16)

Figure 5. Applying paradichlorobenzene with a handy cone-shaped container that holds exactly one ounce.

Figure 6. The ring of crystals should be about 1½ inches wide and 1½ inches from tree trunk.

Figure 7. If the chemical is placed against or close to the tree trunk severe injury may result.

Figure 8. In this case the crystal ring is too far from the tree trunk for effective results.

GET ACQUAINTED with Your TREES

Orchard Trees Have Individual Characteristics and the Study of These Characteristics is Essential to the Grower Who Aims at Maximum Production. Observation of Foliage Will Often Disclose Special Needs for Quickly Available Nitrogenous Fertilizer

By W. W. Weir

Chilean Nitrate of Soda Educational Bureau

ONE of the principal differences in fertilizing fruit trees and crops like small grains, corn, and grass, lies in the attention given to individual plants. When a farmer applies fertilizer to a field of wheat, for example, he does not consider each individual plant—for that would be impossible—but he treats the thousands of separate plants collectively as a unit. Thus he fertilizes his *wheat*, or his *field* of grain, or his *crop*. On the other hand, when an apple grower, for example, applies his fertilizer, he is confronted with quite a different proposition—he must give attention to each tree.

It is interesting to note the terms used by successful fruit growers when their attention is directed to that part of their farming business which deals with fruit growing. A grower may talk about orchard management, but when he discusses the use of fertilizers, he tells how he fertilizes his trees. You never heard a general farmer tell of how he fertilizes his wheat plants or his corn plants. In this respect, a successful fruit grower feeds his trees in very much the same manner as a successful dairyman feeds his cows—both give considerable attention to the characteristics of individuals. The dairyman knows from experience that a thorough knowledge of the characteristics of each cow in his herd is an important factor in economic feeding and milk production. The grower of profitable fruit has learned by experience that it pays to give his trees individual attention in order to profitably increase the productive capacity of his orchard.

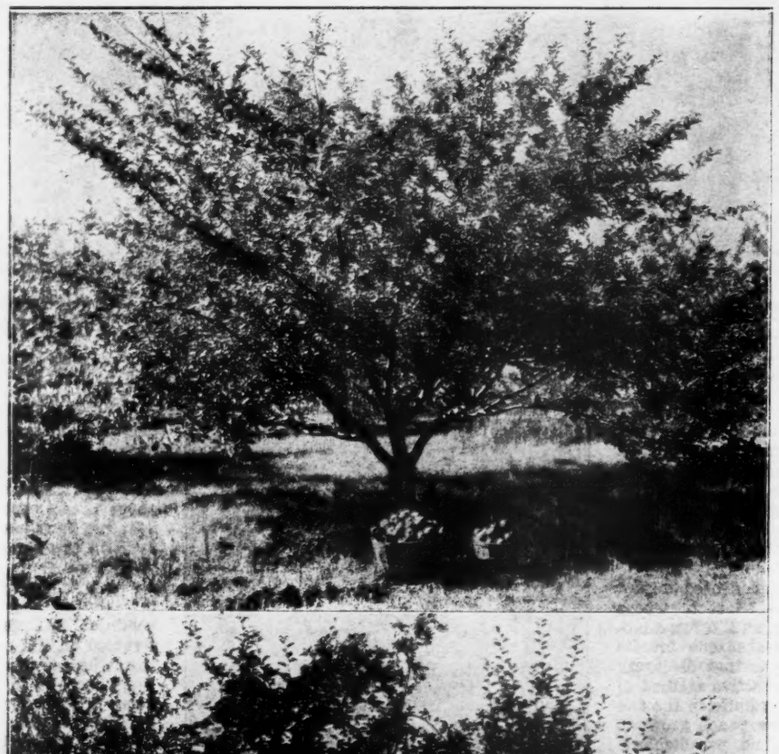
Conditions and Trees Differ

If the soil in an orchard were uniform in every respect, and if all fruit trees of each kind exhibited like characteristics and like growth habits, the use of fertilizers in orchards could undoubtedly be reduced to a comparatively simple practice of merely applying a fertilizer. Thus, uniform and consistent results could be expected. But in the ordinary orchard (apples, for example), the soil varies, the trees differ, and many of the trees may give "inconsistent" returns from the same fertilizer treatment.

Unfavorable conditions within as well as outside of the tree may cause irregular bearing, uneven fruiting, poor or excessive vegetative growth, or unfruitfulness. In other words, an unfavorable condition, whatever it may be, is very apt to be reflected in the poor performance of the tree. But as the poor performance may not indicate what the trouble is, the solution of the problem may best be found by studying carefully the behavior of each tree, particularly its response to any special treatment that may be given in any effort to increase individual production.

A yellow color of the leaves often indicates the need for more nitrogen. A tree planted in a sandy spot may require both phosphate and potash in addition to nitrogen, while a nearby tree in heavier soil may show no significant response, like most trees, to either phosphate or potash. Some varieties require more pruning than others. Some may have poor fruit-setting "habits," whereas others may bear every other year.

Many of the injurious effects of unfavorable external conditions may be easily observed and, with the proper amount of attention, overcome. Other bad effects, probably caused for the most part by external conditions, may be particularly noticeable, but difficult to correct, for example, off-year bearing. Still other effects, as some which result in unfruitfulness, are plainly shown but difficult to diagnose, because the appearance of the tree may be deceiving; and further, the effects may indicate an unbalanced condition within the tree as regards the relation between nitrogen and carbohydrates. Since the problem of irregular bearing and of the nitrogen-carbohydrate ratio are so closely related to the special need of certain trees for nitrate nitrogen, let us consider these problems with a view to gaining some clearer idea as to how these problems may best be solved.



(Above) A ten year old Baldwin apple tree (on sod) which appears productively fit but which produced only 1¾ bushels of apples. For want of nitrogen there appears to have developed within the tree an unbalanced nitrogen-carbohydrate condition.

(Below) A ten year old Baldwin apple tree (on sod) which produced ten bushels of apples in response to an application of four pounds of nitrate of soda, applied in the spring about the time the buds began to swell. Standing is Mr. Charles Wickson, manager of the Hubbard Orchard, Middletown, Conn., who said the apples had size and good color.

Irregular Bearing

The "habit" of some trees of producing fruit every other year seems to be perfectly natural. But investigators have found that such irregular bearing is neither a habit nor the nature of a tree. It seems, rather, a tree's peculiar performance due to a lack of nitrogen. According to Dr. H. D. Hooker of the Missouri Experiment Station, this so-called "habit" can be overcome by the judicious use of nitrogenous fertilizer. For trees from 15 to 20 years old, 3 to 6 pounds of nitrate of soda or other quickly available nitrogenous fertilizer per tree, applied in the spring about the time when the buds begin to swell, will do the trick.

Ordinarily, an apple tree carries on three important "bearing" activities, all in process about the same time, namely, developing and maturing the fruit, growing new terminal wood, and producing spurs and next-year fruit buds. Nitrogen is required in these processes. If the supply of nitrogen is deficient, the development and maturity of the fruit will proceed at the expense of the other processes, or, the development of new wood, spurs, and next-year fruit buds may not progress normally. Consequently, the following year may find the tree lacking a part of its productive equipment, and failing to bear.

Applying nitrogen in the spring not only aids fruit development but encourages the growth of new terminal wood, of spurs (on last year's terminal wood), and of fruit buds on the spurs. In other words, the tree is able to function normally each year and become a permanent profitable producer if other conditions allow.

According to Dr. Hooker, irregular-bearing York and Wealthy apple trees may not respond to nitrate treatment as do trees of other varieties. He suggests that, to break the off-year habit of trees of these two varieties, it may be advisable not to apply any fertilizer during the bearing year but apply it in double quantity during the off year instead—an application in the spring and another of equal quantity in the fall about thirty days before the trees shed their leaves. Dr. Hooker further suggests that, should nitrogen fertilizer alone fail to effect the desired change, thorough pruning during the winter following the fruiting and repeating the second winter will be a further help in solving the problem.

Nitrogen-Carbohydrate Relations

Another good reason why, in profitable orcharding, it is important to give attention to individual trees is that more balanced or (*To Page* 19)

"Most of the pickers are young people of high school age or thereabouts, who are out for a vacation as much as for remuneration."

Fully 90% of the fruit grown in the Sturgeon Bay district is marketed through the co-operative growers' organization, an outstanding success.

At STURGEON BAY

The Door County Peninsula is the Site of Wisconsin's Most Concentrated and Intensive Fruit Producing Section. The Sour Cherry, a Million Dollar Crop, Leads in Acreage and Production

By Alton H. Finch

University of Wisconsin

"THEY EXPECT you to choose cherry pie for dessert," someone in the hotel said on my first visit at Sturgeon Bay. Cherry pie is always available in Sturgeon Bay. It seems to be one way to make the guest acquainted with the fruit that is the pride of the community. Needless to say it is most effective. Cherries are the "talk of the town" at Sturgeon Bay. During the summer the people almost think in terms of cherries. One does not wonder at that however. The cherry industry has brought a revenue of more than a million dollars a season into the community whose total population approximates only eight thousand persons.

The Sturgeon Bay or the Door County district is uniquely located at the extreme northeastern border of the state. A mental picture of the location is easy. Place your left hand palm down. Imagine that this is a map of the state of Wisconsin. The tip of the little finger would be touching Lake Superior, bordering the state on the east would be Lake Michigan. The space between the thumb and the index finger would represent Green Bay, a body of water 15 to 20 miles wide. A peninsula, indicated by the thumb, extends in a northeasterly direction into Lake Michigan for a distance of 80 miles. This is the Door county peninsula. At a point on it marked on our map by the knuckle of the thumb, Sturgeon Bay cuts in a southerly direction to within a mile or two of Lake Michigan. To make the isolation complete, the government has constructed a canal from the eastern end of the bay to Lake Michigan affording passageway to Lake Steamers. Previous to the construction of the canal, ships trading in Green Bay ports were obliged to enter by way of a passage at the north end of the peninsula. Because of the rough water there and the number of accidents that resulted this passageway came to be known as the "Porte des Morte" by the early French voyagers or Death's Door as it is now called. From this passageway, Door county received its name.

The fruit industry of Door county is not limited to cherries. Apples are also of major importance. Strawberries and other small fruits are grown in a limited way. Of a total of approximately 7,500 acres of orchard, apples make up almost 2,000 acres of which about 85 per cent are of bearing age. Practically all of the remainder are devoted to cherries. About 50 per cent of the cherry acreage is in production now with more coming in each year. The acreage of other fruits, mainly plums, is negligible. Production is centered in four districts, chief of which is the immediate vicinity of Sturgeon Bay. The other districts are in close proximity to smaller bays farther north on the peninsula.

Only sour varieties of cherries are grown. The total bearing acreage is about equally divided between Montmorency and Early Richmond varieties. The Montmorency produce some 60 per cent of the crop. The younger plantings are largely Montmorency. The bearing acreage of apples consists mainly of Wealthy, McIntosh, Snow and Northwestern Greening varieties. Commercial acreages of Duchess, Dudley, and Wolf River are common. The same varieties are represented in the younger plantings but McIntosh predominates. It is perhaps the favorite apple.

Fruit growing in Door county is essentially a large scale industry. While there are many small holdings, the bulk of the acreage is held in large tracts. This is particularly true of the cherry industry. Orchards of 80 to 200 acres and more are commonplace. One cherry orchard reputed to be the largest in the world comprises some 700 acres. During the growing season the "camps" of the larger growers take on a factory-like activity. From five or six to twenty or thirty men may be employed through the season with several hundred at harvest time. Tractors and power machinery is used almost exclusively. Complete machine and blacksmith shops are maintained for their repair. Spraying, cultivating and harvesting are all done with the aid of modern machinery.

The question has often been asked, "Why is there this concentrated fruit production in Door county?" The question seems especially well put when one considers the isolation of the industry. Wisconsin is not generally regarded as a fruit producing region. One travels miles throughout the state and sees hardly more than a few farm orchards until coming to the northeastern extremity where on a secluded peninsula fruit trees grow well and a fruit industry thrives. There are no doubt several factors contributing to the success of fruit growing in this locality. Not least among these is location. Few sections are located as to be so completely surrounded by water. Water is literally "everywhere," in vast expanses that influence temperatures materially.

Winter temperatures tend to reach a minimum very gradually, coming as a rule well into the winter allowing more time for wood and buds to harden. Apple buds are rarely injured. Montmorency cherries do not suffer greatly but occasionally there is considerable loss in the Early Richmonds. This has been minimized to a considerable extent through pruning and fertilizing practices which bring spur formation in the trees. Fruit buds produced on spurs are the more hardy. Incidentally this same practice stimulates production. The problem of winter injury, however, is not by any means completely solved. There are some young plantings of cherries on the western shore of Lake Michigan near Milwaukee and elsewhere. It is doubtful if any of them will attain the degree of success reached at Sturgeon Bay, simply because of the difference

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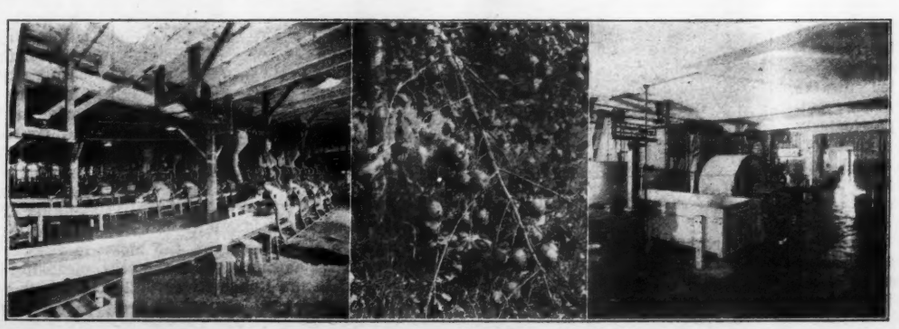


Removing the Residue from Apples and Pears

In This Second Article the Subject of Cleansing Agents is Discussed, in the Light of the Experiments and Demonstrations Conducted in Rogue River Valley. Hydrochloric Acid Appears to be Most Practical

By F. S. Jones

Oregon Agricultural College

PART II

THE novelty of these machines in the fruit packing industry naturally occasioned among growers and shippers more or less discussion of their relative merits. Although some experimental work was devised for testing out the relative merits of these types of machines, it is doubtful if they were established with any high degree of certainty. It is sufficient to state that each one has merits of its own and each gave very satisfactory service during its initial season. Unstinted praise is due the manufacturers of these machines for their contribution to the solution of an extremely difficult situation.

The Cleansing Solution

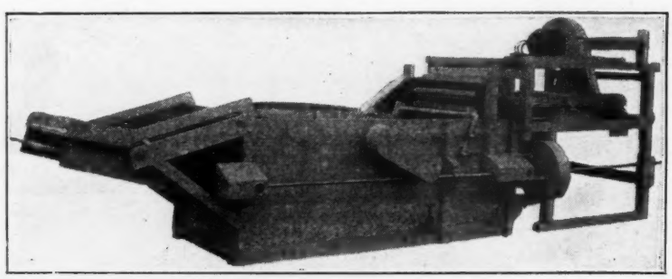
Other reagents than hydrochloric acid are known to be possible for use in spray residue removal. The success attending its use in 1926, however, coupled with a certain degree of reluctance on the part of packers to experiment, put this compound first in the list of possible cleansing reagents. Among its distinct advantages may be mentioned: convenience of purchase, low cost, dependable concentration, rapidity of solution, ease and completeness of removal by running water, and some antiseptic properties. On the other hand, in original containers, its handling by unskilled labor is not devoid of risk of severe burning, and its corrosiveness on machinery and containers in dilute solution necessitates construction of pumps and conveyors of rather expensive non-corrodable material. Thus far, no accidents to workmen in this industry have occurred from its use, and manufacturers have met with a fair degree of success in circumventing the corrosive action on pumps and other machine parts.

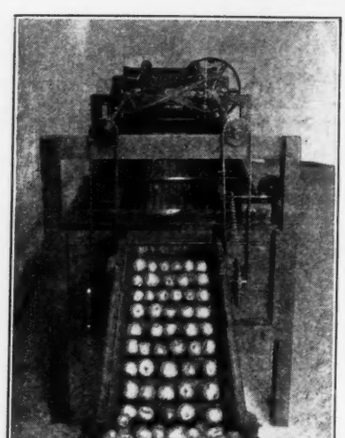
Low Concentrations of Acids Are Effective

In the crude dipping vats of 1926, the acid was used in concentrations ranging in the main from 0.25 per cent to 0.85 per cent. At times and in certain places concentrations as high as 1.25 per cent were noted. The corrosive action of the acid solution on machine parts operated in 1927 to keep its concentration in the tank on the various types of machines as low as was consistent with thorough cleansing. The highest concentrations of acid, of course, were used in that type of machine which made use of shortest contact of cleansing reagent and fruit. The 25 or 30 machines operated in this district were under a fair degree of chemical supervision, the aim of which was to vary the concentration of the cleansing acid with thoroughly recognized difficulties involved in the effective removal of the spray residues from fruit variously treated in the season's spray program.

From close contact with the season's operations from start to finish, it is believed that fully 50 per cent of the 1927 crop in the Rogue River Valley was effectively cleaned with an acid concentration approximating 0.5 per cent by weight. For similar reasons, it is believed that not over 20 per cent of the crop required for effective treatment an acid concentration greater than 0.75 per cent. In particularly stubborn cases, it is known that concentrations as high as one and one-half per cent were employed.

Simple instructions imparted to operators of the machines in the matter of diluting the concentrated acid to solutions of suitable concentrations for the work on hand, and a series of reserve tanks placed conveniently near the machine tanks, made it relatively easy to employ any concentration of acid deemed necessary by the supervising chemist in treating fruits from various orchards.





THREE TYPES OF FRUIT WASHERS

As "necessity is the mother of invention," so the need for equipment that would remove the spray residue from fruit has been met by inventive ingenuity. The machine shown in the first installment and the three pictured here are but some of the many machines that have been designed to cope with the problem of spray residue removal.

All practical machines follow the same principles in general. The fruit is immersed in the cleansing solution or is forcibly sprayed or splashed from all sides. It is then rinsed with clear water and dried with air currents.

Owing to the use of hydrochloric acid in the cleansing solution, the gears, tubing, paddles, etc., had of necessity to be constructed of materials not acted upon by the acid. Any necessary metal parts have to be enclosed.

The fruit is in continuous motion from the time it is dumped into the machines, until it is discharged, cleaned and dried.

Cleaning adds wonderfully to the appearance of apples and pears without in any way impairing the keeping qualities of the fruit.

Minor Difficulties Are Still to Be Solved

Unfortunately for ease of removal, spray residues are not arsenical residues only. Of late years, especially prepared mineral oils have replaced in part lead arsenate and lime-sulphur for the control of insect pests which develop with the higher temperatures of late summer. These coatings of oil are found to be more or less of a hindrance to the complete removal of the arsenical residues. With but one or two exceptions, however, the most stubborn cases encountered in the season of 1927 in the Rogue River Valley yielded to prolonged contact of fruit with the cleansing acid not substantially over 0.75 per cent in concentration. Since a special solvent for the oil does not at present appear to be feasible, growers are facing another incentive for the reduction of the spray program to the absolute minimum consistent with insect control.

Another difficulty in successful cleaning presents itself with the advance of the apple packing season. The wax-like secretion on the ripened fruit of some varieties is more prominent than on others. The combination of naturally secreted wax, mineral oil, and residues from inorganic sprays in some instances comes very near preventing the complete removal of the objectionable ones. The most feasible procedure at present is insistence upon picking at the proper time and upon washing immediately after picking. In spite of these two outstanding difficulties, the district's laboratory records for the 1927 packing season will support the claim that fully 90 per cent of all shipments made were well within the established tolerance on arsenic in fruit products.

When it is stated that varieties of pears thus commercially operated upon include the Bartlett, D'Anjou, Comice, Bosc, and Winter Nelis, and that varieties of apples washed include Yellow Transparent, Grimes Golden, Newtown, Gravenstein, Jonathan, Arkansas Black, Black Twig, and Spitzenberg, it must be clear that the peculiarities of individual varieties do not constitute a serious hindrance to the most extended employment of the acid treatment.

Experiences of Other Districts

The relatively early maturity of pears and apples in the Rogue River Valley and the generally heavy applications of sprays there are circumstances which forced upon that district, substantially ahead of all others on the Pacific Coast, the acid treatment for meeting federal requirements in the matter of arsenical residues in lieu of the unsuccessful mechanical and hand wiping processes. In effect, this district became in a certain sense an experimental laboratory in 1926 for the entire Pacific Coast. Its rather unanticipated success with the acid treatment in that year gave it virtually a year's lead over other fruit growing districts of the Northwest in the matter of cleansing procedure. Other districts in the Northwest, particularly in the great Columbia River Basin, in Oregon and in Washington, entered upon the 1927 packing season with practically no experience in the use of the acid solvent. They have made, however, substantial progress in the application of the washing process to their own peculiar conditions.

They, too, in 1927 introduced for use the three types of washing machines mentioned earlier in this article. Unfortunately, for the very efficient cleansing action of that type of machine which employs the principle of deep submersion, a hitherto unobserved peculiarity of some varieties of apples very forcibly claimed attention early in the season and forced the abandonment of this principle in washing operations. Anywhere up to 40 per cent of some varieties have a tubular opening of minute diameter extending from calyx to core. The hydrostatic pressure resulting from submergence below eight or 10 inches of cleansing solution is sufficient to fill the core with the acid and all it may

(*Continued to next page*)

A QUALITY PEACH CAMPAIGN

By C. A. WHITTLE

A WELL-PLANNED peach thinning campaign was waged by the Extension Service of the Georgia State College of Agriculture during the spring of 1928, with excellent results.

This campaign consisted for the most part of a series of letters sent to every commercial peach grower in the state, each letter briefly advancing some single argument in favor of thinning, short enough to be read and just long enough to fix in the mind of the reader the message of the writer.

These letters were reinforced as far as possible by extension horticulturists and county agents visiting the growers in person and urging upon them the necessity for prompt action.

Peach growers of Georgia have learned from bitter experience how unprofitable large crops are. It was obvious to all growers late in the winter and in the early spring that Georgia was to have another large peach crop. Their minds therefore, were open to the suggestion of thinning for quality peaches and fewer of them.

Speaking of the outcome of this campaign, W. F. Turner, horticulturist of the Central of Georgia Railroad, who made observations over the entire peach belt of Georgia, said: "The outcome has been a very happy one. While the response has not been exactly even over the state, still it may be said that no section of the peach territory has ever done as consistent thinning as has been done this year. All sections have done much work, and in some localities all of the heavy crops have been thinned.

"The proper methods of thinning have been followed, which has never been done before. As a consequence, good results are already apparent."

Investigations made by the College of Agriculture of the cost of thinning 4000 trees, five years old, heavily fruited, revealed the fact that the work of thinning had been done at a cost of five cents per tree.

At the Georgia Experiment Station work is being carried on in co-operation with the United States Department of Agriculture to ascertain the effect of fertilizers on the production of high yields of quality peaches and on the keeping or shipping quality of peaches. Important results have been developed which, taken with proper thinning, should place the Georgia peach in a much better position for bringing increased returns to the grower.

As a result of the thinning campaign, more Georgia peaches were marketed as "classified" than ever before. Early peaches, such as Mayflower, Uneeda, Red Bird and Early Rose, have to be one and five-eighths inches in diameter to be shipped as "classified." Carmans, Georgia Belles and Elbertas have to be two inches; Fancy Hileys, two inches, No. 1 and 2 Hileys, one and seven-eighths inches. Variations from these standards are allowed to the extent of 10 per cent of the fruit being below specifications.

Removing Spray Residue

(*From preceding page*)

carry in solution. The acid and arsenical residue carried with it cannot be removed, and in a short time, this causes destruction of the surrounding tissues to such an extent as to lessen very seriously the market value of the fruit. Fortunately, when the cleansing solution is thrown against the fruit in the form of finely divided sprays, it does not penetrate these tubular openings, and, as previously noticed, these forcibly driven sprays are very effective in bringing about solution of the spray residues.

One other set of circumstances defeated the 100 per cent success anticipated at the opening of the season in the operation of the spray type of machine in these districts. In these sections apples ripen much later than in the Rogue River Valley. Wax develops very prominently in some varieties before picking, or soon after. The relatively low atmospheric temperature lessens the efficiency of the acid solution in effecting the solution of the spray residues when once they are covered more or less with wax. Experimental field tests and work now in progress in the chemical laboratories of the Oregon Experiment Station indicate that the solution of the difficulties will be solved by the maintenance of artificially produced higher temperatures of the cleansing solution, combined with such improved methods of harvesting as will result in varieties that produce a super-abundance of wax, reaching the cleansing solution before extensive development of that wax takes place.

Two years' experience, then, in the use of the acid treatment for the removal of spray residues from pears and apples points to ultimate success on the part of growers and shippers on the Pacific Coast in meeting what appeared at first to be an impossibly high standard for shipment of these fruits in interstate and foreign trade.

The Market Review

By PAUL FROEHLICH

United States Bureau of Agricultural Economics

LARGE crops of fruit of all kinds were still in prospect during July, and it seemed likely that 1928 will be a good fruit year. To avoid the possibility of unprofitable prices, every effort is being made by growers and shippers to grade the fruit closely, to widen the distribution, to keep culls off the market, and to increase the volume and variety of by-products. A large share of western fruit crops and some of the eastern production is taken care of by drying or canning. Direct marketing, either through roadside stands or by parcel post and express shipments, also will be used to a greater extent than ever before. Fruit growers in many parts of the country are developing strong co-operative organizations to assist in handling the increasing production.

A Glance at the Markets

Apples were moving actively from California, Washington, Illinois, Tennessee and numerous eastern states. Illinois was temporarily exceeding all other states in movement of early varieties. Week by week, the total volume of apples was reflecting the heavier production of the present season.

June condition of Gravensteins in the Sebastopol district of northern California was 85 per cent of normal, compared with 44 per cent a year ago. Local estimates indicate possibly 1800 cars of Gravensteins available this year, and movement was well started during the first week of July. The clearing house had set an f.o.b. price of $1.75 per box. In the Watsonville area, prospects were excellent for Bellflowers and Yellow Newtowns. Combined condition of all varieties in the Watsonville district was 98 per cent of normal, while in June of last year it was 60 per cent. Jobbing prices of eastern apples had declined by July 10 to a general range of $2-$3.50 per bushel basket.

State agricultural officials in Illinois have issued locally a warning against a new type of "bootlegging," which deals in cull apples. Many buyers, according to this report, haul culls by truck out of southern and western Illinois to cities, where they sell this inferior fruit at prices near those received for good apples. Growers are urged to see that their cull fruit does not fall into hands of unscrupulous dealers, and they are asked to dispose of the lower grades through by-products factories.

Peaches in Georgia were still bringing fairly good prices, though the tendency was downward as volume increased. By July 10, Georgia was shipping 400 cars daily and the season for Belles and Elbertas was just beginning. Elbertas, of course, always constitute the bulk of the season's output. Shipments were being closely graded to comply with the state law. Size and quality of the later varieties were expected to show improvement over the earlier fruit. One prominent firm had arranged to can a portion of the surplus peaches in Georgia this year. Carmans for shipment fresh were bringing $1-$1.35 per six-basket crate during early July, and the shipping-point range on Hileys was $1.50-$1.75. Canners in California have agreed to pay growers $25 per ton for No. 1 peaches, which is somewhat better than last year's price. In addition to the heavy shipments of peaches expected in Georgia and California, other leading states, such as the Carolinas, Tennessee, Illinois and Arkansas, will soon be very active.

Other Fruits: Cherry shipments from California totaled 1040 cars, compared with 680 last season. Washington and Idaho forwarded six times as many cherries as in 1927, and Oregon's total also was greater than last year. By July 10, the combined movement of this fruit from seven states was twice the corresponding figure for 1927.

Early movement of California *grapes* was fully double that of last summer, and very heavy shipments are expected during the next few months. Quality of first shipments was none too good. In view of the anticipated heavy production of western grapes, there is some talk already of leaving part of the crop on the vines and marketing only the best.

Like other western fruits, movement of California *pears* this season has been very active, compared with last year. By July 10, about 800 cars had been forwarded, as against 100 at the same time last season. California *plums* and *prunes* had totaled 2240 cars, compared with 1450 a year ago, and a considerable quantity was yet to come.

July Crop Reports

From present indications, this will be a year of fairly heavy fruit production, but an unusually large proportion of the total fruit crop is in the Pacific Coast states. In most other states the apple, peach, pear, and grape crops will be intermediate between the light 1927 production and the heavy crops of 1926. The chief exceptions are the rather heavy peach crop in the Southeast and the scarcity of all fruits in Nebraska, Kansas, Oklahoma, and parts of Missouri where a late freeze caused widespread loss.

Apples: The total apple crop is now estimated at 178,185,000 bushels. This would be about a third more bushels than were harvested last year and about one-fourth less than the heavy crop produced in 1926. The estimated commercial apple crop of 33,196,000 barrels reflects the rather heavy production expected on the Pacific Coast. East of the Mississippi, the main commercial apple areas seem to have only fair prospects. There has been general complaint of a heavy "June drop" and northern areas report prospects for a rather light crop of Baldwins, the main winter variety, with fall apples relatively heavier. Some Virginia areas report prospects for a fairly large crop of good quality, while some northern sections complain of scab.

Peaches: The present forecast of peach production, 65,981,000 bushels, is 45 per cent larger than in 1927 and only 4,000,000 bushels short of the record 1926 crop. The important states, except in New Jersey and Colorado, Kansas and Oklahoma, show increases over the generally short crop of 1927, the heaviest increases appearing in southern states, where production seems likely to be nearly as great as in 1926. California, Washington, North Carolina, South Carolina, and Georgia report the best crop in years.

Pears: Prospects for pears are particularly good in the Pacific Coast states, where almost two-thirds of the total crop will be produced this year. Prospects are only fair in eastern United States. The total crop of pears is now estimated at 23,356,000 bushels, or 29 per cent more than in 1927 and about eight per cent less than in 1926.

Grapes: The July 1 report on grapes indicate prospects for heavy crops, both in California and in the remainder of the country. The California crop, including the green weight of grapes for juice and raisins as well as those for table use, is estimated at 2,555,190 tons, compared with 2,264,000 tons harvested last year. Production outside of California is estimated at about 300,000 tons, compared with the short 1927 crop of about 200,000 tons.

Other Fruits: Present indications are that the California prune and apricot crops will each show a decrease of about five per cent from the heavy production of last year. California reports excellent prospects for the new crop of oranges and above average prospects for lemons. Florida reports prospects for both oranges and grapefruit much better than at this time last year. The condition of these fruits is about up to the average of the last 10 years and, as the number of bearing trees is increasing, a fairly large total production is to be expected.

The Outlook in Canada

Conditions in Canada on June 1, which are based entirely on blossom prospects, were never more promising for a good crop of fruit in all the producing provinces. Without exception, all kinds of fruit showed heavy blossom. As the amount of bloom is little or no indication of the eventual yield, however, no estimate of production will be received until later in July when the results of the June drop are known. British Columbia,

To Insure 1928 Fruit Profits

"To avoid the possibility of unprofitable prices, every effort is being made by growers and shippers to grade the fruit closely, to keep the culls off the market, and to increase the volume and variety of by-products.

"Fruit growers in many parts of the country are developing strong co-operative organizations to assist in handling the increased production."

which is more advanced than any of the other provinces, is very hopeful for a good crop of apples, peaches, cherries, plums and small fruits. In the eastern provinces, weather conditions have been cool and wet during the blossoming period, and it is feared that the yield will not be as heavy as might be expected.

Growers in British Columbia had prospects on June 1 for a crop of apples in excess of those of 1927 and 1926, when commercial shipments amounted to 3,238,400 boxes and 3,935,500 boxes respectively. Conditions were based on the heavy show of blossom, however, and until the June drop is completed, no accurate estimate of the crop can be formed. Once the set is assured, an abundance of water for irrigation purposes, and healthy trees practically free from winter injury, will aid in obtaining an increased yield. Prospects for peaches are above those of last year. Indications in Nova Scotia are for an apple crop about 10 per cent above last year's commercial crop of 925,000 barrels.

Conditions in Europe

Official and trade reports on conditions during the first half of June, in most of the important apple and pear producing countries on the continent, indicate a 1928 apple crop somewhat larger than that of last year, if weather conditions remain favorable. The European pear crop, in spite of unfavorable prospects in southern Europe, may be considerably larger than last year's poor crop. Frosts have caused some damage this spring, but apparently mainly to pears and early fruits in southen Europe, and in the case of apples only locally.

Prospects for the fruit crop of England and Wales were variable as of June 1, compared with a good crop last year, according to the report of the Ministry of Agriculture. The set of dessert apples, however, was generally satisfactory. Cooking apples appear good on the whole, although Bramley's Seedlings suffered damage in some places. Pears have set well and the crops should be average.

American Prune Exports

Prospects for the sale of American dried prunes in France during 1928 will depend largely on the size of the French and Yugoslavian crops, according to a personal canvass of Bordeaux importers. In general, importers appear to be optimistic concerning prospects for 1928, although some doubt is expressed as to the possible effects of the higher import duties.

By reason of the diminishing production of French prunes in the Lot-et-Garonne, there is a constantly increasing market for California and Oregon prunes in France. The annual consumption of prunes in France is estimated from 16,500 to 22,000 short tons, and, as the French production at present scarcely exceeds 5500 short tons per annum, foreign prunes, especially those from the United States, must be brought in to make up the deficit. American prunes are obtaining a permanent place as an article of French consumption.

With reference to conditions affecting the market for dried prunes in France this season, a good deal depends upon the size of the French crop. If the Serbian prunes should be quoted at a lower price than the American, a repetition of what occurred a few years ago is expected, namely a considerable increase in imports from Serbia. Latest estimates on the 1928 prune crop of Yugoslavia confirm earlier reports that the total prune crop and the exportable surplus of dried prunes will be below the average but above the low crop of 1927.

Germany also takes considerable quantities of American dried prunes. From September, 1927, to May, 1928, about 49,230,000 pounds of prunes were imported by Germany, of which 35,651,000 came from the United States and the remainder from Yugoslavia. For the corresponding period in 1926-27, total imports were 44,744,000 pounds, but only about 19,000,000 originated in the United States. This means that last season's shipments of American dried prunes to Germany were nearly double those of the year before.

Paper Mulch Tests Show Favorable Response

PAPER of the type used as a mulch in pineapple production in Hawaii has been found to be applicable also to a wide variety of crop plants in the eastern United States, according to Dr. L. H. Flint, physiologist of the United States Department of Agriculture, who has recently completed four years' study of the possibilities of paper mulch and its effect on plant growth. Increased yield and growth have been secured by the use of impervious-paper mulch with such common garden crops as corn, beets, carrots, green beans, squashes, and others. In many instances the yield was from one and one-halt to three times as great as from unmulched crops.

The results of the experimental work are presented in Technical Bulletin 75-T, "Crop-Plant Stimulation with Paper Mulch," just published by the department. On the basis of the plot tests thus far made, the use of paper mulch, says Dr. Flint, in addition to increasing yields, eliminates all weeding between rows, facilitates weeding between plants in the row, and does away with the necessity for cultivation. In certain crops, further advantages reported are increased germination which results in greater yields, a marked hastening of maturity, and a superior crop product in point of size, quality, and cleanliness.

The type of paper used in these trials—the heavy, asphalt-saturated and coated thermogen—was especially designed to withstand the weathering of the three to five years' duration of the pineapple plantation. It seems possible, says Dr. Flint, that a less durable paper may be cheaper and as satisfactory over a short period. The extent to which paper will find a place in gardening and griculture can be determined, he says, only through wide individual experimentations. The practical use of paper mulch will depend largely on its economy as affected by the labor requirements, the markets, the particular crops concerned and climatic conditions.

Various mulching papers are being studied by the department at the Arlington Experimental Farm and elsewhere to find a cheaper paper that will be satisfactory under varied soil and seasonal conditions.

A copy of the bulletin may be obtained by writing to the United States Department of Agriculture, Washington, D. C.

Fruit Farm Engineering

By E. W. LEHMANN

Proper Lubrication Adds to the Pleasure of Driving

POOR OIL or inadequate lubrication will result in lack of power in an automobile engine and may eventually ruin the engine. No phase of automobile or tractor operation should be given more careful attention than the lubrication. It has been well said that poor oil is expensive at any price; it is therefore poor economy to buy other than the very best oil. Well advertised standard brands are nearly always good, not because they are advertised, but because it does not pay in the end to spend a lot of money in advertising a poor product.

The function of an oil in a gas engine is to keep the wearing surfaces apart to reduce friction, also to seal the space between the cylinder walls and the pistons, preventing the gases escaping past the piston on the power stroke. A function of a lubricating oil is also to dissipate the heat of the engine without destroying its lubricating value. A poor oil causes loss of power in much the same way as the lack of sufficient oil.

An automobile motor operated a few minutes without sufficient oil may result in an expense bill that is more than would be the cost of oil for several years' operation. If the automobile owner would keep in mind the fact that for every dollar he spends for oil he spends $25 or more for fuel, repairs, taxes, insurance and garage expense, he would realize the truth of the statement that it is poor economy to economize on oil. Too much is involved.

The oil filters and air cleaners are two devices found on most cars which greatly improve the lubrication of the automobile motor. Much of the dirt that formerly got into the cylinders of a motor is now removed by the air cleaner, and much of that which does get in is now removed by the oil filter. The oil is kept cleaner and may be used for a much longer period without changing than formerly.

While there are other causes of a motor overheating, the lubrication should be the first thing to check. In fact, on a long trip, it is advisable to check the oil level at frequent intervals. Although the oil level may be maintained, heating may be partly due to the oil being ineffective on account of being thinned out. By using one standard brand of oil, the driver can soon learn how often the oil should be changed. In comparing different oils, the operator will find that some oils will retain their lubricating qualities much longer than others. However, it is not good practice for the individual owner to do much experimenting; it is better to accept the recommendations of the manufacturer of the car you drive.

While the motor is the most essential part of a car to lubricate, and the same is true of a tractor, there are other parts which should not be overlooked. The transmission gears may become stuck or difficult to shift, due to lack of lubrication. It is desirable to drain the transmission case once or twice a year, wash it out with kerosene, and refill with new transmission oil. The same will apply to the differential gears.

To make a car ride comfortably all the time, do not neglect the springs and spring bolts. On late model cars equipped with fittings for using a grease gun, the oiling of the spring bolts is a simple matter; however, the springs are often neglected and the spring leaves become rusted. If you have allowed this to happen to your car, apply a thin oil on the edges of the spring leaves with a brush and you will note a great improvement.

Squeaks and rattles can also be largely eliminated by applying a little oil at the right place. The most noticeable effect of oil is when a little is applied to the hinges, locks, and catches on a sedan door that is hard to shut. The best advice to the automobile driver is to devote a little more time to the oiling of the car if he would get the greatest pleasure from driving it.

Results of Farm Electrification Studies

THE RESULTS of three years' work conducted by 23 state experiment stations investigating the use of electricity on the farm are most gratifying, according to Prof. Frank D. Paine of the Iowa Engineering Experiment Station, who discussed this subject before the Country Life Conference at Urbana, Ill., in June. What has been attained? First, the facts and factors concerning the application of electric light, heat and power have been determined. The farm homemaker can light the home with 25 kilowatt hours per month, do four family washings with two kilowatt hours, iron it with five more. She can furnish an abundant supply of both soft and well water with two or three kilowatt hours. The electric refrigerator, a convenience needed in every farm home, is operated for a month with a consumption from 50 to 80 kilowatt hours.

The progressive farmer is always interested in applying power to save labor. Results of the experimental work show that he can light his barns and yard with 35 kilowatt hours per month, milk 10 cows a month with 27 kilowatt hours, separate this milk with 2.5 kilowatt hours. These are typical examples of results; complete reports from projects give these facts for over 100 different applications of electricity to agricultural production.

Prof. Paine pointed out further that another most important result which has been obtained is that farmers, farm organizations, public utilities and manufacturers have not only become keenly interested, but have become more optimistic concerning the possibilities of rural service. This interest has stimulated a desire to learn more about the problem. Consequently, thousands of farmers, a great many farm organizations and others have assembled the available material, studied it, analyzed it, and have discovered the actual cost of line construction, the reasons why a rural is different than an urban rate and that from an economic standpoint the average consumption per farm should be at least 1200 kilowatt hours a year. Furthermore, these people conclude that they have a responsibility if electric service is to be provided and they are ready to accept it.

He stated that the public utilities have also accepted their responsibility in this matter and have made marked progress in the adoption of policies for the building of rural service lines, the development of a system of rates and the establishment of a rural service department, all of which encourage the promotion of this class of business.

Automobile and Telephone Aids to the Farmer

SOME PEOPLE seem to delight in pointing out the hardships of the farmer and the disadvantages of living in the country, without considering the modern improvements which are continually making country living better. One disadvantage of living in the country, which has been pointed out recently by the sociologists of New York State College of Agriculture, which is probably more apparent than real, is that that there are fewer doctors in the country now, as compared with the number a few years ago. The telephone, the automobile, better roads, the county nurse, and better hospital facilities at centralized points in many localities, have more than counteracted the effect of the decreased number of doctors, as far as getting medical service in the country is concerned.

We should not overlook the fact that farm homes can be made just as modern as city homes, and with modern methods of communication and transportation now available to the majority of people in the country, many farm homes are better places to live in than the city. There is an increasing amount of truth in the statement relative to many farm homes, that they have all the advantages of the city and none of the disadvantages.

It is reasonable to assume that there should be fewer doctors needed in the country than formerly. In the first place, in many localities there are fewer farm people who need medical attention in the same area as formerly, and the second and most important reason is that the use of the telephone, the automobile, and better roads makes it possible for a doctor to greatly reduce the time required on the road. It is also possible for the doctor to avoid wasting time in making house to house calls when a telephone is available to determine some idea of the condition of the patient. Due to the automobile, in many localities conditions are actually improved over what they formerly were, although there may be less than half as many doctors available now as formerly.

Only a few years ago the farmer 10 miles from town was completely isolated. In time of sickness, there were no means of communication other than to go by horseback, or drive, to the nearest doctor's office to ask that he come at the first opportunity, with the possibility of finding him away on a call with no means of reaching him. In most localities at present a telephone can be easily reached in a short time, if there is none in the farm home, and by its aid one or more doctors can be summoned in an emergency even from a distance, without wasting the precious minutes required to "ride for the doctor." And in the case of an accident, in many communities the patient can be taken to a hospital 20 to 30 miles away by automobile before the doctor could have been notified a few years ago. It seems such changes make conditions better than formerly.

Lack of Power in a Gas Engine

THERE are a lot of causes for the loss of power in a gas engine and for this reason an operator should know his engine pretty well to tell what the real trouble is when it begins to lose power. Probably the most common cause for the loss of power

in a gas engine is an accumulation of carbon. An occasional inspection should be made to note the condition. If it is found that carbon accumulates rapidly, make an effort to determine why it accumulates and eliminate the carbon.

There are a number of practices and conditions that result in carbon accumulation and finally loss of power. Probably the most common trouble is burning too rich a mixture. This may be due to improper adjustment of the carburetor or running with the choke out. If a black smoke comes from the exhaust, it is evident that the mixture is too rich.

The oil is the next place to look for trouble. If a cheap grade of oil is being used, better change to an oil of a higher quality. Too much oil in the crank case is liable to cause trouble. The mechanical condition of the motor always influences the amount of carbon. Little carbon will accumulate in a motor that is in good condition mechanically. Badly worn pistons, scored cylinders, or broken or worn rings allow an excess of oil to work into the combustion chamber. Under such conditions, overhauling the engine is necessary to prevent the trouble.

In a booklet published by one of the large tractor companies, the effects of carbon deposits in a motor are outlined as follows:

Carbon deposits reduce the power in three ways. By filling part of the combustion chamber space, they prevent a full charge from being drawn in. They cause preignition by reaching a sufficiently high temperature to ignite the incoming mixture too soon, which is evidenced by the well-known carbon knock. They prevent the free transmission of excess heat through the walls of the combustion chamber into the cooling water and thus cause overheating.

To eliminate these troubles, it is essential that the carbon be removed. It does not require a lot of skill to do this. Simply remove the cylinder head and carefully scrape out all carbon that is found in the combustion space.

There are many other gas engine troubles that result in a loss of power. The mechanical condition of the motor is always a factor. Inadequate cooling, poor lubrication, ignition and carburetion troubles all come in for their share of the blame for loss of power. These points will be discussed in later issues.

Designing Tornado-Proof Buildings

ACCORDING to L. V. Teesdale of the Forest Products Laboratory of the United States Department of Agriculture, the damage to buildings by tornadoes and the loss of life by tornadoes may be avoided or reduced by designing buildings to resist internal pressure. This is an idea in building construction that is not generally recognized, but one that explains many of the freakish things that happen during a tornado.

A few years ago I saw the effect of a tornado on an old brick house. One side wall of a bedroom collapsed outward and the beds and other furniture in the room were left untouched. A window hinged outward would no doubt have saved the wall.

Mr. Teesdale points out that property damage to buildings by tornadoes may be divided into two classes—that caused by the explosive effect and that caused by flying debris. The explosive effect, usually the more serious, occurs as a result of a difference in atmospheric pressure set up by a tornado between the inside and the outside of a building. The sudden drop in external air pressure produces an internal pressure which frequently results in the blowing out of some portion of the building.

"It is possible to relieve the internal pressure of air thus set up in a building by providing automatic vents in it," says Mr. Teesdale. "Observations made following the St. Louis tornado last September indicate that from 10 to 15 per cent of the outside walls and a similar area in the roof should be vented. There are a number of methods by which this could be done. If a sufficient number of windows or panels were designed so that they would open outward from internal pressure, the necessary venting could be accomplished. Special windows equipped with hardware which would work on the same principle as the panic bolts used on exit doors in theaters would do the trick. Hinged panels for use in the spaces between windowsills and floors or elsewhere in the side walls of a building is another venting possibility. Roofs may be vented by automatic dormer windows, by special skylights, or by hinged roof panels."

Water Systems Aid in Fire Control

EVERY YEAR the demon, fire, dreaded and feared by human beings since the beginning of time, takes its toll among farm buildings. This waste on the farm is one that may be largely eliminated by providing adequate equipment for fire protection. Because of the difficulty of supporting fire trucks in the country and of mobilizing a fire-fighting force quick enough to be effective, it is important to provide for some means of fire prevention around farm buildings which can be easily and quickly called into use.

There are innumerable ways in which fires on the farm start, many of which can be prevented or put out before they have done any harm. Many times the smell of smoke serves as a warning of smouldering fire which has not yet been fanned into a flame. A hydrant in the barn, the garage or the hog house, or running water in the residence, may prevent partial or total loss of some farm building. Non-freezing hydrants with a convenient underground valve placed at strategic points around the farmstead provide a ready supply of water for use in case of emergency. Carrying water from the well or a water tank may be too late to be effective.

A garden hose attached to a hydrant fed by the farm water system often makes fire control possible before enough help comes to form a bucket brigade. One or two such hydrants in every building offer emergency fire protection as well as a handy supply of water for the stock.

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CHATS with the Fruit Grower's Wife

By HAZEL BURSELL

IN THE "Chats" department for July we discussed the canning of fruits by the cold pack method. This month we shall continue along the same line, giving detailed instructions for the successful canning of meats and vegetables. Of course, it is well understood that meats and vegetables can be safely canned *only* by the cold pack method, so no other system will be mentioned here.

Both vegetables and meats are looked upon by many housewives as "hard to can" and "hard to keep" after they are canned. We can truly say, however, that if the proper method is followed, if a sufficiently long time is allowed for the cooking process, and if correct storage is provided, the canning of both types of food products becomes a simple, routine matter with uniformly perfect results assured. Deliciously flavored canned meats and vegetables mean the conserving of farm produce which might otherwise go to waste, and they are a source of great pride and satisfaction to the canner. Furthermore, such a thrifty housewife always has in her store room the "makings" of a quick and satisfying emergency meal, an advantage that is not to be overlooked. It must also be remembered that canned vegetables and fruits are the chief sources of vitamines and minerals as well as variety in food flavors throughout the long winter months.

Precautions Given

Due to the wide publicity given to several cases of botulinus poisoning contracted from eating certain types of non-acid home-canned vegetables, some housewives, even though skilled canners, have given up the canning of vegetables. For these and all other home canners I wish to "lay the ghost" of fear of botulinus poisoning. No one need worry about this deadly poison if three very simple precautions are observed, besides, of course, the proper sterilization of the vegetables in the canning process.

1. Never, under any circumstances, use a canned product which shows even slight indications of spoilage. Inspect the food carefully at the time the can is opened and discard any product having an unusual appearance or odor, and do so *without tasting the food*. Mushy, softened foods, gas bubbles and unpleasant odors are certain signs of spoilage.

2. Boil rapidly for five minutes any non-acid vegetables, such as peas, beans, corn, carrots, etc., on taking from the can, even though they show no ordinary signs of spoilage. This simple precaution will destroy botulinus poison and render it impotent, should there be even an imperceptible trace of it in the product. If you wish the vegetable cold, as for salad, boil it for the five-minute period, and then allow it to cool again.

3. Do not use spoiled foods even though they may have been boiled. Be careful what you do with spoiled meats and vegetables. Do not feed them to chickens or livestock as they may become poisoned. If there is any suspicion that the product might contain botulinus, boil for one hour and then bury deep in the soil in some spot that is not cultivated. The botulinus bacteria come from the soil and cling to the vegetables; therefore we must take precautions not to "seed" more soil with the bacteria.

Advise Your Friends

Lest our readers become alarmed over the possible botulinus menace, I will add that the deadly baccillus causing all the trouble is not often present in the soil and is found only occasionally in far scattered localities. There may never be any of the baccilli in your soil, and then again there *might*. It is best to play safe by observing the three precautions given above. Urge your neighbors and friends to do likewise.

Select Sound Products

Now we come to the actual canning of vegetables. Select fresh, tender, sound vegetables. Remember that the product that comes out of the jar can be no better than that which went into it, so use only young, tender vegetables and can them as soon after picking as possible. All vegetables which are directly exposed to the air or soil should be washed and drained. Tomatoes canned in mid-season have a richer flavor than those canned later in the season, due to the effect of cool weather.

Almost all vegetables may be canned, but it is a useless waste of time, effort and money to can those which may be kept in storage in some other form, such as potatoes, shelled beans, lima beans, salsify, parsnips, turnips, carrots, squash, pumpkins, or cauliflower. These will keep better in their natural states than in cans. Cauliflower will keep for months when stored in a dark, cool, frost-proof place. Salsify, parsnips, carrots, turnips and other root vegetables will usually keep in the ground where they grew, except in extremely cold climates, where they may be dug and stored dry but unwashed in a cool, dark cellar. Dry beans, squash and pumpkins require a dry storage place.

Prepare Vegetables

In general, I would say that you prepare each vegetable for canning as you would if it were to be cooked for immediate use. This would mean the washing, stringing and cutting of green beans, the shelling of peas, the peeling of tomatoes and beets, the husking and cutting of corn from the cob, and the washing and picking over of spinach or other greens. The corn kernels may be cut from the cob either raw or after setting the milk by boiling for a few minutes (which process would take care of the blanching at the same time). Cutting the corn raw insures a creamier, softer canned product, while cutting after the milk has been set eliminates much waste in the cutting.

The next step in vegetable canning is the "blanching," a preliminary scalding process that makes for better flavor and color and improved keeping qualities. It is followed by the cold dip to cool the vegetable and "set" the color. While preparing the vegetables, you will save time if you have a boiler half full of water on the stove heating in readiness for the blanching. The boiler should have a tight fitting lid, to prevent the escape of steam. For blanching, place the vegetables in a white sack, such as a clean flour sack, and immerse in the boiling water, leaving one corner of the sack out so that it can be removed without burning the fingers. Leave them in for the exact time mentioned in the time table for blanching, given in this department in the July issue. Two exceptions to this process occur to the writer—tomatoes and beets. For tomatoes, the process of scalding to remove the skins would also serve for the blanching. I place several selected tomatoes in a wire basket at a time and immerse in a kettle of boiling water just long enough so that the skins will slip off easily. Beets should be given a preliminary cooking until tender and the skins will slip off easily. This also takes the place of blanching. Corn cut from the cob raw would also be excepted from the blanching and cold dip as all the "goodness" would be lost in the blanching water.

When the vegetable has been properly blanched, each according to its particular needs, remove from the blanching water and plunge at once into a bucket of cold water. This process gives to peas, beans, asparagus, etc., a most attractive bright green color.

Use Big Top Jars

Next pack the blanched products in thoroughly washed and sterilized jars, preferably of the wide-mouthed self-sealing type. Pack so that the jars are well filled, but do not cram them full. Season to taste with salt (about two level teaspoonfuls to the quart), pepper and any other seasonings desired. Fill the jars to all but overflowing with water and put the caps and lids in place. Some authorities advocate using hot water to fill the jars, but this is not necessary.

Vegetables, with the sole exception of tomatoes, require much longer time for cooking and sterilizing than do fruits. Most of them require three to four hours in the water-bath outfit, described last month, and from 30 to 90 minutes in the pressure cooker at 10 pounds pressure (about 240 degrees Fahrenheit). The correct time for each was also given in the schedule last month. The water in the water-bath outfit should be kept boiling all the while the jars are processing, as raising and lowering the temperature may cause breakage. It may become necessary to add hot water to the water bath to take the place of that lost in evaporation. Remember that there is little danger in over-cooking vegetables, while there is grave danger in undercooking.

Follow the instructions given last month for the cooling and storing of fruits. It is necessary to be even more particular about storing vegetables in a cool, dark, dry place than for fruits.

Canning of Meats

There are two ways of preparing meats for canning, both resulting in good but differently flavored products. One method is to cut the meat raw from the bone, leaving it in serving-sized chunks and packing directly into wide-mouthed self-sealing jars. The bones may then be placed in a container partly filled with cold water and allowed to simmer and thus provide broth for the meat in the jars, if the housewife wishes to be truly economical. Discard any large pieces of fat when filling the jars, as canned fat is unpalatable.

The other process is to give the meat a preliminary cooking before packing in the jars. The cooking may take the form of roasting, boiling until the meat loosens from the bones, or frying (as for surplus sausage). All the drippings and broths would be religiously saved to be used in filling the meat jars. They should be allowed to cool and the fat skimmed off before being added to the meat. The cooked meats thus secured may be, and usually are packed into the jars hot, but they may be allowed to cool for convenience in handling. It makes no difference in final results.

Anyway, the process is practically the same for both systems—pack the meat in jars in serving-sized pieces, fill the jars to overflowing with water (either hot or cold) or broth, and sea-

son with salt and pepper. About one rounded tablespoonful of salt to a half-gallon jar of meat is my usual proportion. A little onion improves the flavor of beef, while sage is excellent with pork.

Scrape Scaly Fish

For large, scaly fish, place in a white sack, dip in scalding water for a few minutes, remove, and then scrape off the scales. (The scalding makes the scales come off easily.) Small fish and certain of the large varieties do not need scalding, but only a thorough washing, with possibly a light scraping to remove the "slimy" coating. Cut from the bones at once into serving-sized chunks, taking care not to break the chunks in packing, and place in sterilized, wide-mouthed, self-sealing jars. For fish that has little natural fat, the addition of a few tablespoonfuls of olive oil to the quart is an improvement. Next fill the jar with water and season with salt, allowing about one level tablespoonful of salt to the quart.

For shell-fish, the fish should be removed from the shells, washed carefully to remove sand, etc., and packed in sterilized cans, either whole or minced, as preferred. Some persons insist on removing the digestive tracts from shell-fish, but this is seldom, if ever, done by commercial canners. Next, season with salt and pepper and fill the jars with water.

Process Six Hours

Now we are ready to put on the lids and process our meat or fish products. For the water-bath method I cook all meats or fish for six hours, boiling continuously. That may be longer than some authorities say is essential, but it is a sure method, as I have never lost a jar of meat through spoilage, and the final product is most delicious. When done, remove from the fire and cool gradually where no draft can strike the jars. The time table gives 90 minutes at 10 pounds pressure (240 degrees Fahrenheit) as the necessary processing period for meats in the pressure cooker.

When cold, store in a cool, dark, dry place, or, if such a place is not available, wrap jars in paper and pack in boxes, labeling each box as to the variety contained. Meats require extreme care in storing.

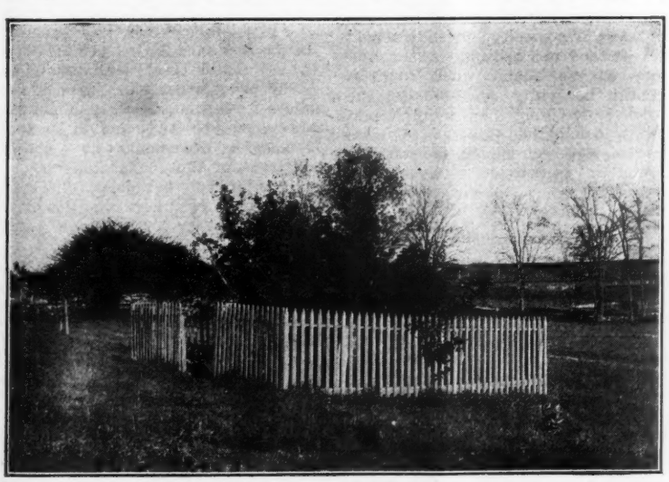
In any canning, it is wise to consider carefully the size of jars best used for a given product, whether fruit, vegetable or meat. One family may be able to eat a quart of salmon at a time, while another may be able to use only a pint. Another may like its prunes in half-gallon jars, while quarts or pints may be adequate for others. Use the correct size of jars and avoid left-overs!

The Endicot Pear Tree

By J. H. MERRILL

ON JULY 3, 1632, the colonial authorities of Massachusetts granted to Governor John Endicott the Orchard Farm for his services. This farm was a tract of land consisting of 300 acres located in what is now Danvers, Mass., but which was then a part of Salem.

Some time between the date of granting and 1640 the Governor built his home there and set out his orchard, vineyard and garden. Today, but a single pear tree remains to mark the site of the Governor's home.



This Massachusetts pear tree is 300 years old.

The Rev. William Bentley records in his diary that on Sept. 21, 1796, he visited the Endicott Farm, and after visiting the site of the old mansion he saw that "there is a fine prospect in front and a general descent to a little creek in which the Governor kept his shallop. Tradition says there was a walk to this place with Damson trees and grapevines so thick that a person might walk unobserved. These have all been gone for years. This place was called the Governor's Orchard, as he planted, early, trees around his house. There is only one tree left, which bears the Sugar Pear, and by tradition was planted in 1630. It is in front of the site of the house, it rises on three trunks from the ground, and is considerably high. It is much decayed at bottom, but the branches at top are sound. I brought away some of the pears, and engaged such as remained to be brought to my house to send to the governor of the commonwealth (Samuel Adams)."

J. W. Hanson, in "The History of Danvers," describes and pictures the tree as it appeared in 1848. He says that "at all events the tree bears unquestionable marks of age. The main part has slightly decayed, but it has sent out vigorous suckers, and bears an abundance of fruit. It looks likely to live a century longer."

Mr. Hanson's prophecy seems destined to become true, and his description of the tree as it appeared in 1848 would furnish a good picture of the tree as it appears today, 80 years later.

Protect Your Peach Orchard Against the Borer

(*Continued from page 5*)

The pupa becomes fully matured in from three to four weeks, when it works its way out of the cocoon, and the adult moth emerges. A few moths may emerge in the southern part of the Gulf States during the latter part of July; however, the heaviest moth emergence in the South occurs during the month of September. In the North the moths emerge much earlier. In the latitude of northern Virginia peach borer moths start to emerge in June. No satisfactory explanation has ever been given for the earlier moth emergence in northern latitudes. The emergency date of practically all other insects, common to the eastern part of the United States, is much earlier in the South than in the Northern States. Oviposition, which usually lasts only a few days, begins shortly after the moths emerge. A female peach borer moth usually deposits from 400 to 500 eggs, and they are mostly laid on the tree trunk, although some are deposited on the limbs and leaves, and even on weeds and soil near the tree. The length of the incubation period depends on climatic conditions. During July, August, and the early part of September in the South the eggs hatch in 8 or 9 days.

Upon hatching the little larvae make at once for the tree trunk and they usually enter it at the surface of the soil. They display a natural tendency to crawl down toward the base of the tree trunk. They usually bore directly into the bark, although they sometimes enter a crack in the trunk, and feed rapidly on the bark layers and cambium of the tree after gaining entrance. With favorable feeding conditions, they attain considerable size within a few weeks. A few of the late hatched larvae grow very little before spring, and in the South it is not uncommon to find larvae only ¼ of an inch in length during March and April. Practically all the eggs have hatched, and the little borers are within the trees by October 10 in the latitude of Fort Valley, Georgia. Twenty to thirty borers have been found in a single tree; however, the number usually found in peach trees in Georgia peach orchards will average about three. There is but one generation annually.

Control

For many years peach growers wormed their trees to protect them from the peach borer. Even at its best, worming is not a satisfactory control measure, as borers are often missed, and the injury to the tree from worming instruments is often more severe than that from the insect. However, if carefully done, worming will keep the insect in check reasonably well, but it cannot be classed as a very effective control measure.

The worming process consists of mounding the trees just before the moths emerge (Fig. 4), so as to force the small larvae to enter the tree higher up than normally. This makes it easier to locate the borers during the worming process in the fall. In the South the worming is usually done in November or December. The mounds are torn down, and the soil is removed from the base of the tree to a depth of 6 or 8 inches. The borers are then removed with a sharp hawkbill knife. In worming peach trees the incisions should always be made vertically if possible, and care should be exercised not to injure or cut any more of the sound wood than is actually necessary in removing the borers or crushing them in their burrows. After the trees have been wormed, the soil should be replaced around the tree to decrease the possibility of injury to the trees from freezing weather.

Paradichlorobenzene

The work with toxic gases against the peach borer which was begun by E. B. Blakeslee of the U. S. Bureau of Entomology in 1915 and continued until 1918, brought out the use of paradichlorobenzene as a very effective control for this destructive peach pest. The continuation of the paradichlorobenzene studies by the U. S. Bureau of Entomology at Fort Valley, Georgia, from 1921 to 1927, inclusive, and the results of work by several of the agricultural experiment stations, notably those of New Jersey and Illinois, have contributed materially to our knowledge of the successful use of this valuable insecticide.

Paradichlorobenzene is a white crystalline material, insoluble in water, and possesses a characteristic odor somewhat resembling that of ether, which is irritating to the mucous membrane of the nose. Crystals of about the fineness of granulated sugar have been found most satisfactory for peach borer control. They vaporize slowly at ordinary temperature, and the vapor is much heavier than air. Temperature and moisture greatly influence the rate of evaporation of paradichlorobenzene crystals. The higher the temperature and the drier the soil, the more rapid is the generation of the gas from the crystals. Continually wet soil may prevent the normal diffusion of the gas through it, and thereby cause a gas concentration near the crystal ring. The gas is deadly to insects when confined in the vapor, but is not poisonous to man or domestic animals. When the material is applied properly and at the right time, as specified in the following directions, a 90 to 100 per cent control may be expected. In addition to the high rate of control, paradichlorobenzene has another advantage over worming in avoiding serious injury to the trees, which often results from the use of

Figure 9. Several shovelfuls of soil should be placed on top of the crystal ring and packed gently with the back of a shovel.

worming tools in the hands of careless laborers.

Age of Trees

In the Southern States paradichlorobenzene can be used with safety on healthy peach trees four years of age and older. In that region it should not be used on one, two, and three year old trees, as experiments have shown that trees of those ages may be severely injured by paradichlorobenzene under certain weather conditions. It will be necessary for Southern peach growers to continue to use the old method of worming one, two, and three year old trees for borer control.

In some of the states in other regions paradichlorobenzene is recommended for trees of all ages. Experiments conducted by the Indiana Agricultural Experiment Station, and the Illinois State Natural History Survey have shown no injury to any age trees under conditions in that latitude, and in those and some other states outside of the southern territory paradichlorobenzene is recommended for use on any age trees.

Size of Dose

For four and five year old peach trees use three-fourths of an ounce of the chemical per tree. For trees six years of age and older, of average size, use the full one ounce dose per tree. One and one-fourth ounce doses should be used on very old trees, if the trunks are unusually large. In States where the chemical is also recommended for young trees it is usually used at the rate of one-half ounce for one and two year old trees, and one-half or three-fourths of an ounce for three year old trees.

When to Apply

Experimentation has shown that

EMBROIDERY -- By All Means

By VIVIAN LEE

STYLES may come, and styles may go, but embroidery goes on forever!

There is certainly more truth than poetry in this because needlework has, obviously, been holding its own for centuries. In fact, a stroll through any art museum will bring to your attention hand-made pieces of inestimable value.

There are many reasons why modern women, too, should decorate their homes with articles embroidered by themselves. Embroidery has never failed to enhance the beauty and charm of a home. It, literally, makes the home, which is the sublime purpose of every woman.

To start you off on embroidery as it is today—a most simplified state—I am illustrating on this page some useful items that are extraordinarily simple to make.

With summer here, there are those pleasant hours before the sun sets when you are sometimes at a loss for something to do. Needlework is a very pleasant pastime and it will charm these leisure hours away.

Chair Back Set on Tan Linen.

No. 581 is a perfectly delightful Chair Back Set of excellent quality tan linen. The peacock design which is really very good taste, is carried out in self-color and peacock blue "Boil-Fast" floss.

The working time on the embroidery will take only about three pleasant hours. They will be hours well spent and you will, no doubt, agree that the articles will help considerably in beautifying your home very economically.

Embroidery patterns stamped on linen, with silk floss and instructions may be obtained postpaid, at 75c each, from AMERICAN FRUIT GROWER, Embroidery Department, 19 Union Square, New York City.

best results with paradichlorobenzene for peach borer control are obtained in the fall at the end of the oviposition period of the insect. At that time the borers are small and more easily killed by the gas. The material should not be applied earlier on account of the possibility of a late infestation becoming established, and on the other hand the application should not be delayed since very little volatilization of the chemical takes place after the soil temperature drops below 60°F. the latitude of the Gulf States the chemical should be applied from October 1 to 5 for the northern section, October 10 to 15 for the central section, and October 15 to 20 for the southern section. In the mountainous section of northern Georgia the chemical should be applied between September 25 and October 1.

Dates for applying paradichlorobenzene in other peach producing sections are as follows:*

South Carolina—Between October 1 and 14. In the northern and western parts of the state the application should be made about October 1, and in the southern part nearer October 14.

North Carolina—September 15-30 in Piedmond and Mountain sections. October 1-15 in Sandhill section.

Tennessee—October 10-15.

Virginia—September. May applications are recommended in cases where for an unavoidable reason the fall application could not be made.

Maryland—Around September 15 for western Maryland. October 1-15 for Eastern Shore.

Pennsylvania—September 10 to 30 for northern and elevated counties. September 15 to October 15 for southern counties.

New Jersey—September 15 for northern half of state. October 1 for southern half of state.

New York—First week in September.

Connecticut—September 1 for a six weeks' exposure.

Massachusetts—Last week in August and first ten days of September.

Ontario, Canada—Mid-September.

Michigan—Late in August or about the first of September.

Indiana—Northern, September 10-20; central, September 15-30; southern, September 25-October 10.

Illinois—Northern, September 10-October 5; central, September 20-October 10; southern, September 25-October 15.

Missouri—North of Missouri River, September 20 to October 5; South of Missouri River, September 25-October 10.

Arkansas—Last week of September and first week of October; one week later for southern part of state.

Colorado—First two weeks in September.

The desired results cannot be expected unless the material is applied on or very close to the dates recommended, and growers are cautioned to give careful attention to this point.

Preparing the Soil

No preparation of the soil is necessary except to remove grass, weeds and trash for about a foot from the tree trunk, and then smooth the soil surface with the back of a shovel. Do not mound the trees before applying the paradichlorobenzene if there are no borers working in the tree trunk above the soil level. As the gas from the chemical is much heavier than air, any borers working in the tree above the point where the crystal ring is placed will not be affected by the gas. Consequently, it is very necessary to place the crystals at least at the level of the topmost borer gallery. Should there be indications of borers working in the tree trunk just above the soil level, sufficient soil should be placed around the tree to bring the level of the soil up above the gumming exudation before applying the chemical.

How to Apply

The material should be applied in a continuous band about one or one and one-half inches wide about the tree, and about one or one and one-half inches from the trunk (Figs. 5 and 6). Avoid placing the crystals against the tree (Fig. 7), or too far from it (Fig. 8). Several shovelfuls of soil free from stones, sticks and trash should be placed on the crystal ring and packed with the back of a shovel (Fig. 9). The packing of the soil after it is placed on the chemical is important in order to prevent surface loss of the gas and to prepare a mound which serves as a container for the gas. This mound also prevents surface washing of the crystals. Avoid pushing the crystals against the tree trunk with the first shovelful of soil when covering the ring.

Later Attention to Mounds

In using paradichlorobenzene around four and five year old peach trees in the South, growers are advised to tear down the mound twenty-eight days after applying the chemical to trees of those ages, in order to remove all unspent crystals and to allow the confined gas to escape. As an added precaution against injury to the older trees in the South, it is also advisable to tear down the mounds six weeks after making the application to trees six years of age and older. If the soil is removed from below the original soil level in tearing down the mounds it should be replaced before cold weather sets in.

In regions where paradichlorobenzene can be used with safety on young trees it will perhaps be well to remove the mounds twenty-eight days after applying the chemical, although this may not be necessary as in some states outside of the southern region no attention is given to the mounds until the spring following treatment.

Grade of Paradichlorobenzene

Orchardists are strongly advised to use only **unadulterated paradichlorobenzene**, and when ordering to specify a grade of about the fineness of granulated sugar. Successful results can not be assured with a compound containing only part paradichlorobenzene and part of an inert material, since there can be no certainty of the amount of the chemical present when used.

*These dates have been supplied by the State Entomologists of the states mentioned.

Cultivation with Fertilization Increases Pecan Yield

LEE HAWKINS of Barnesville, Ga., finds cultivation and fertilization of pecans very profitable. On 33 trees that were 20 years old, he harvested 1320 pounds of nuts. On 60 trees of the same age and variety, he produced 1120 pounds. Each tree received 116 pounds of fertilizer and a heavy application of manure and mulch. The only difference in the treatment was that in the 33-tree plot the soil was broken in the early part of April and cultivated after every shower when permissible, while in the 60-tree grove the soil was not broken until late April and cultivated only one time during the entire season. Mr. Hawkins is going to fertilize his whole grove heavily and practice rapid cultivation during the whole season this coming year.

Use the blank on page 20 for your renewal.

At Sturgeon Bay

(Continued from page 7)

in winter injury due to their location.

There is little frost injury at blossom time. Loss of crop or any part of it from spring frost is practically unknown. While the spring temperatures are uniformly cool they seldom drop to freezing after the blossoms have broken. A relatively large loss does occur some years from the dropping of cherries. This appears to be correlated with cool temperatures at blossoming and pollination time and in the ten days or so following when growth is getting under way. It has been mistaken by some growers for frost injury. It constitutes another problem yet to be solved.

The Soil

The soil of the Sturgeon Bay district is in general a sandy clay loam favorable to the root growth of fruit trees. In spite of this, many sections of the Door county peninsula do not produce the best growth of trees or yields of fruit. This is not because of poor soil but because of poor drainage conditions. Underlying the greater part of the whole district is a limestone formation which is said by geologists to be continuous from Illinois to Canada. This limestone strata lies at a depth varying from almost nothing to several feet below the surface. Where it is pierced by cracks and fissures cherries do excellently, but where it is sound and intact water stands producing "wet feet," the trees do not grow well and yields are poor. Fortunately all of the earlier plantings of cherries were made on soil having the proper kind of underlying substratum to allow for good drainage. Around Sturgeon Bay they were confined largely to one ridge which has been very productive.

The lack of organic matter in the soil coupled with a deficiency of nitrogen and a short growing season has introduced certain cultural problems. An application of nitrogen bearing fertilizer has been found to be necessary for both cherries and apples and has given very good results. An average of about four pounds per bearing tree is put on the early part of May. Young trees are often given from a half to one pound. While the application of fertilizer has become a standard part of the orcharding practices some growers have been able to reduce the amount of fertilizer by the use of leguminous cover crops and yet maintain a fair growth in their trees. Others have tried to.

Cover Crops

The growing of cover crops appears to be the best way to keep up the organic content of the soil. Of the crops that have been tried the biennial white blossom sweet clover is giving the best results. Few growers are agreed as to the best method of handling it. What is being done by some and what is certainly one of the best methods is to plant the seed with the last of the spring cultivations. This comes about the middle of June. The following spring the sweet clover withstands heavy cultivation and yet makes sufficient growth to provide an abundance of organic matter to the soil. The advantages of both the legume cover crop and the cultivation are to some degree obtained. A mistake that too many of the growers are making is to try to substitute the cover crop for cultivation and fertilization.

The short growing season attended by cool temperatures is not inducive to the best tree growth. Hence, much attention has been given the matter of cultivation, cover crops, fertilization and pruning for the common purpose of obtaining the best condition of growth in the trees. At the present time the matter of keeping the old cherry trees growing well is one of the big problems confronting the growers. The first of the heavy plantings were made about 1912, these trees are now reaching the age when it is difficult to keep them in the best growth condition. Heavier pruning along with the best cultural practices must be resorted to if the present heavy yields are to be maintained. There is only one case of which the writer is aware where under Sturgeon Bay conditions too much growth is obtained by normal orchard handling. The Wolf River apple grown rather extensively becomes unproductive if fertilized or even cultivated heavily.

The Cherry Harvest

Cherry harvest time comes about the middle of July. It is then that all Sturgeon Bay rubs its eyes, yawns, wakens, and becomes a center of activity. Cherry pickers several thousand strong are employed. In the evenings they come to town and throng the streets and shops that at any other season are never crowded. A merry-go-round and ferris wheel is set up in town to entertain them—and to share in their earnings. They are housed for the most part in camps at the orchards although small camps dot every wood and hillside. One Y. M. C. A. boys' camp conducted at the county fair grounds supplies pickers for the smaller growers. Most of the pickers are young people of high school age or thereabouts who are out for a vacation as much as for remuneration. Needless to say there is much gaiety accompanied also with more or less inefficiency. Many of the growers are coming to depend more on local help. The automobile has increased the radius from which it can be obtained. It is more mature, more interested and generally more effective.

All cherries are picked on the piece work basis at a cost ranging from 2 to 3 cents per quart depending upon season and whether the stems are left on or removed. Approximately 20 per cent of the cherries are shipped for the fresh market. These are picked with the stems on. Those that are canned or cold packed are "milked," that is, the stems are left on the tree.

Fully ninety per cent of the fruit grown, both cherries and apples, is marketed through the cooperative growers' organization—the Door County Fruit Growers' Union. It is an outstanding example of successful cooperative endeavor. Four-hundred and fifty growers or about 98 per cent are members. All of the larger growers but one belong. This grower operates his own canning factory at his orchard. All of the capital stock in the Union is held by growers. Small and large growers alike profit through their membership. Individuals and not stock vote.

The Fruit Growers' Union is the result of an organization formed in 1911 and reorganized for the purpose of expansion in 1917 when heavy plantings of young trees began coming into bearing. Its processing equipment handled as a subsidiary consists of the cherry canning factory, cold packing and precooling plant, and warehouses in Sturgeon Bay and two pitting and cold packing stations in the northern districts. These combined have an output capacity of sixty carloads of cherries daily. Approximately sixty per cent of the processed fruit is canned, the remainder going into cold pack. The canning plant operates the most efficiently of any that the writer knows of, not excepting the modern plants of California and the Pacific Coast. The fact that it is built for and handles only cherries to any extent accounts largely for this efficiency. It is reputed to be the largest cherry cannery in the world.

The total gross sales for fruit handled by the Union amounted in 1926 to over one and one-half million dollars. In 1927 due to the very short cherry crop it was only about three quarters of a million. Prices paid the growers for apples have fluctuated with the market, cherries have consistently netted the growers 7 to 8 cents per pound. The size of the output has made it possible for the Union to play a prominent part in establishing the market price of sour cherries. In 1926 the growers were paid more than one million dollars, in 1927 slightly more than half a million. The returns for 1926 are somewhat above the average for the past six years, those of 1927 are much below.

In addition to acting as a fruit handling and marketing agent the Union has consistently functioned as a service organization in the purchase of growers' supplies. In 1926 more than one hundred thousand dollars' worth of supplies were bought for the growers. This service is expected to be enlarged soon by extending financial aid to growers for meeting current expenses incidental to maturing the crop.

In considering the success of the cooperative organization we come again to the same factor which makes the growing of fruit in the district successful, namely, location. Isolated as it is, there is no outlet for Sturgeon Bay fruits except the market in distant cities. To reach this market economically requires cooperation as the Western growers have learned. The isolation also lends stability since there is no competition from commercial packers. There are no commercial fruit packing establishments in adjacent towns to entice growers from the Union—a practice that has effectively killed many similar organizations. Cooperation started with the first commercial fruit harvest in Sturgeon Bay, and bids fair to endure.

Fruit Farm Poultry

By RALSTON R. HANNAS

August in the Laying Flock

BECAUSE summer is here, because feed is still high and because many of the birds have quit laying are no reasons for not feeding any of the birds. Hens lay because they get fed; they are not fed because they are laying. There may be—and undoubtedly are—birds in the flock that do not have the ability to lay. Get rid of them.

It is not difficult to spot these birds that have stopped laying because they do not have the "stuff" in them. Such birds are probably molting now—early molters are generally the poorest layers. Their combs are pale red and are covered with a white, powdery or scaly-like substance. If they are of breeds that naturally have yellow skin, these non-layers will have yellow just around the vent, on the beak—particularly in the corners where the upper and lower beaks come together—and on the ring just inside the eye. If they have not laid for a long time, the shanks will also be yellow. The vent will be dry and puckered up. Get rid of all such hens at once; sell them to the butcher.

The good birds that are left, however, should be given a good dry mash in hoppers kept before them all the time and this should be supplemented with a grain ration fed morning and night. These birds will respond to care and attention and will undoubtedly lay more eggs after the culls are sold than when the culls were in the flock. They will have more room and will have a better chance to get the feed they need, since the culls will not be there to impede them in any way. It will pay to feed these hens.

It will also pay to go through the flock every three weeks to remove the culls, that is, the ones that are not laying.

Watch lice and mites. These pests will sap the vitality of any birds if they are allowed to have full sway. Paint the roosts, droppings boards and nests with a good coal tar disinfectant to prevent mites, and get rid of them if they are there. Dust the birds with a good lice powder, or with sodium fluoride, or dip the birds in a sodium fluoride solution to rid them of lice.

If the house has not been cleaned this season, by all means clean it as soon as possible, removing all movable fixtures from the house and giving them a thorough cleaning in the sun. Sweep down the walls and ceiling in the house, sweep the floor, and disinfect well. Then put back the fixtures and relitter. If possible, do this in the afternoon after most of the birds have laid, so there will not be any disturbance for the layers. It will mean that the house will have to be cleaned hurriedly, and perhaps more help will have to be had than would ordinarily be the case, but if this can be arranged, it should be done.

By all means see that the hens get a good supply of greens. If there is no yard containing green food that the hens can be allowed to run in, then the greens should be cut from a field and carried to the birds.

Chickens Need Lots of Air in Summer

IT MAY seem strange to many to read that "chickens need lots of air in summer," but it's the truth. Where growing birds are crowded together into small houses, these chickens do not get "lots of air." This crowding weakens their vitality and makes it easier for them to contract colds. The result of this crowding is weakened and stunted birds.

All they really need in summer is a shed of some kind that will protect them from the rain and at the same time let the breezes blow through so there will be a good circulation of air. However, they should have protection from other animals. A wire all around the sides of this open shed will accomplish this.

If birds roost out in the trees, this is all right, but care must be taken to have these birds in their permanent houses by early fall before the weather begins to get cold, else there is apt to be trouble with colds. These colds contracted in the early fall nights from pullets roosting in the trees often result in canker or roup, which hangs on into the winter and often into early spring.

The present aim should be, however, to see that birds get plenty of circulation of air in their houses for comfort.

Feed Growing Pullets Well

MANY poultry keepers lose sight of the fact that the crop of growing pullets will some day be the laying flock from which the income in poultry and eggs is to come. These men forget that unless the growing pullets are fed properly and permitted to develop normally, they will be no good as layers. Such men think that as layers the growing birds are bringing no money, there is no use to feed them—let them rustle their own living.

This is a mistake, for the growing period is the most important period in the young pullet's life. If she is fed properly now, she will develop into a much better layer then if she has to search for her food. Laying may start it is true, but it will be late with birds grown under such conditions.

Mash hoppers filled with a good growing mash should be kept before the pullets all the time. Water, fresh and clean, should be easily available for them. The birds are approaching maturity and need to be watched carefully. If their combs are reddening up and laying is beginning before proper body growth has been made, cut down the meat scrap in the mash. Give the birds every chance and help them to grow into vigorous pullets that will stand up under a full year of egg production and return a profit to their owner.

Get Acquainted with Your Trees

(Continued from Page 6)

productive conditions may be established *within* each tree. The condition referred to is commonly called the nitrogen-carbohydrate ratio, whose comparatively recent discovery by Dr. E. J. Kraus and Dr. H. R. Kraybill has attracted wide attention. The technical discussion of the nitrogen-carbohydrate ratio, insofar as it relates to fruit trees, may be reduced to the following practical statements:

1. An unbalanced condition within the tree may be illustrated by an overpruned tree. Here the tree is limited in its carbohydrate synthesis, principally because it has not enough leaves to manufacture them. Carbohydrates being lacking, such a tree does not produce the vegetative growth that induces fruitfulness, even though it may have an abundant supply of nitrogen.

2. Another unbalanced condition within the tree may be illustrated by a young vigorous tree growing on a very rich soil. Here, principally because of an overabundance of water and nitrogen, the tree grows rapidly, and conditions do not allow it to accumulate considerable quantities of starches and sugars necessary for fruit bud formation because they are all used in excessive vegetative growth. The tree, therefore, is unfruitful. With age, such a tree may be expected to become, naturally, a productive tree.

3. Still another unbalanced condition may be illustrated by a tree which was once productive, but, principally because of a lack of nitrogen, no longer produces normal, healthy vegetative growth and is no longer productive. Because of a deficiency of nitrogen, a comparatively young tree may also develop this unbalanced condition. In a tree like this the nitrogen supply is restricted and the carbohydrates, that is, starches and sugars, may accumulate in abundance. Obviously, to such a tree the application of some quickly available nitrogenous fertilizer would be highly desirable and profitable. Very often this type of tree appears productively fit, but is more or less unfruitful.

4. A properly balanced nitrogen-carbohydrate ratio involves two conditions: (1) Carbohydrates are manufactured and accumulate in sufficient quantities to favor vegetative growth and fruit bud formation, and (2) sufficient nitrogen is present to enable the tree to function properly, that is, to grow healthy, green leaves, to set a good crop of fruit, and, at the same time, to produce a good growth of terminal wood, strong spurs, and fruit buds. This is a profitably productive tree, which, of course, is the best commercial tree. According to the experiences of successful growers and results of oft-repeated fertilizer tests, the application of nitrogen to trees of this group is very necessary for the maintenance of productivity.

From general observations, it would seem that the conditions numbered 3 and 4 are the principal ones concerned in commercial orchards. They involve the supplying of nitrogen in order to bring trees of the third group into bearing and to maintain the profitable productivity of trees of the fourth group.

A Practical Demonstration

Probably one of the best demonstrations that may be mentioned to show the practical application of the two principles involved in the third and fourth conditions described in the foregoing paragraphs is the one recently made on the farm of Mr. E. Kent Hubbard of Middletown, Connecticut, in which County Agent Sidney Edwards co-operated.

The trees concerned are Baldwins which were set in sod on an old golf field of medium sandy loam. This orchard was never cultivated. Some different kinds of fertilizer were used to promote growth, and each year the grass was cut and used for mulch around the trees.

In 1925, when the trees were 9 years old, two blocks of 24 trees each were selected in this orchard for a demonstration. Around each tree in one block, 4 pounds of nitrate of soda was applied in the spring about the time when the buds began to swell; whereas the trees in the other block received no fertilizer whatever.

In 1925, no results were obtained, because the trees evidently had developed a tendency to irregular bearing, having produced a crop the previous year. However, during the first year of the demonstration 24 trees were supplied with nitrate nitrogen and 24 trees were deprived of it. Thus, two quite different conditions developed within the trees on the two blocks.

In 1926, the fertilized trees were again given an application of nitrate of soda at the rate of 4 pounds per tree, and the others remained unfertilized. The apples were harvested October 30th, with the results shown in the following table:

RESULTS OF A FERTILIZER DEMONSTRATION ON APPLES (CONN.)

	Yield from 24 trees				
Treatment	Grade A apples	Grade B apples	Grade C apples	Total yield	Total value
Trees unfertilized	12 bus.	38 bus.	13 bus.	63 bus.	$ 46.75
Trees fertilized with nitrate of soda only.....	48 bus.	80 bus.	31 bus.	159 bus.	127.75

When the apples were valued at market prices and the cost of the nitrate of soda figured at 3½ cents a pound, it was found that the 4-pound-per-tree application of nitrate of soda increased the net profits from 24 trees by $77.64.

The accompanying Figures 1 and 2 show two of the Baldwin trees included in the demonstration—one unfertilized and the other fertilized. The unfertilized tree in Figure 1 appears to be productively fit; yet in 1926 it produced only 1¼ bushels of apples because of a deficiency of nitrogen. However, when the nitrogen-carbohydrate ratio in such a tree is kept properly balanced by supplying nitrogen, as for example nitrate of soda, the tree becomes highly fruitful. See Figure 2.

The points briefly discussed and the illustrations given show that the profitable use of fertilizer in the orchard involves considerably more than simply scattering fertilizer over the ground in the orchard. It involves a careful study of each tree with a view to discovering its special needs. The maximum productive capacity of an orchard can be realized only when each tree is in a condition to function properly, that is, in a condition to enable it to be fruitful.

When young people complain of being misunderstood by their elders, it seldom occurs to them that there is no lack of understanding so profound as that of the young for the old. The old have indeed, once been young, but the young, so far, have never been old. Sympathetic affection and tolerance alone can bind the generations together in a strong and happy bond of union.

Index to Advertisements

The concerns whose advertisements appear listed below are equipped to give prompt and satisfactory service to the American fruit grower. Most of them issue literature that is freely at the disposal of our subscribers. It is to the advantage of all that when writing to an advertiser you use the address exactly as it appears in the advertisement, and that you state in your letter: "I Read Your Advertisement in AMERICAN FRUIT GROWER MAGAZINE."

NOTE: Consult the CLASSIFIED DEPARTMENT (self indexed), on page 18 for Classification not listed below.

Cool Air Storage for Apples

(*Continued from page 3*)

so care must be taken to keep the wall dry and the storage room free from condensation. There are many materials on the market for wall filling; hair felt, saw dust, planer shavings, granulated cork, mineral wool, several products of the gypsum mills, etc., each material adapted to special conditions. Many men seem to have an erroneous idea of the value of air spaces in a wall as an insulation. Air to be an insulator must not only be confined but must be dead, for the slightest difference in temperature between the walls of confined air will start the air to circulating, and this active air immediately becomes a good conductor. The efficiency of a so-called dead air space then depends upon the minuteness and the number of the air chambers and the material forming the walls of these minute air pockets. It is thus the purpose of these wall fillers to prevent this confined air from circulating between the walls and conducting the heat from one wall to the other. There are also many insulating boards selling under such trade names as: Celotex, Masonite, Insulite, etc. Their insulating value is high and they are well adapted to problems of remodeling and conversion such as ours. We used steel stucco fabric instead of wood lath to hold our stucco as the wood expands and contracts with moisture and temperature and causes cracks allowing the moisture to enter.

The doors are often the weakest point in storage construction. Too many times we find our frosted apples or our over ripe ones by a poorly constructed door. After careful figuring of costs we decided to buy regular refrigerator doors, from a company that specializes in making that type of door. Our doors are five inches thick, having two inches of cork board, and are hung on regular heavy refrigerator door hardware. They fit tightly and are practically as heat and cold proof as the walls.

Next to insulation is the factor of ventilation. The rapidity with which the fruit can be cooled when brought into storage depends on the temperature and volume of air passing around it. The rapidity of this change is very important as fruit often ripens more in one warm day in the fall than in a week in the winter with the lower temperature. Four complete air changes per hour are recommended and this should be the minimum. Along the sides and end of our storage room we built 10 doors 20 inches by 30 inches in the clear giving nearly 42 square feet of inlet area. In the ceiling we built four outlet doors, 34 inches square, connecting them with ventilators on the peak of the roof by chutes 25 feet in length. The ventilators on the roof are industrial ventilators and have much greater volume than the common type of farm building ventilator. A very slight breeze or a slight difference in temperature between inside and out will start the air circulating. Our inlets are six inches above the ground and the outlets are flush with and in the center of the ceiling. The fruit is raised two inches above the floor allowing the air to circulate beneath. Ventilation is necessary not only to regulate temperature but also to remove the gases given off by the fruit, the accumulation of which cause scald and other storage troubles. It is necessary to ventilate occasionally during the winter.

The third important factor is humidity. We were unfortunate in inheriting from the old building a concrete floor which, while clean and convenient, does not make an ideal floor from the standpoint of humidity. The ideal floor is the dirt floor of clay or heavy soil. This dirt floor should be thoroughly soaked with water before the apples are stored and occasionally during the winter, the floor acting as a huge sponge to maintain a nearly constant humidity. With our concrete floor we have found it necessary to sprinkle the floor daily and sometimes spray the fruit to maintain the highly desirable crispness and snap. A concrete alley through the center of the storage room might be very convenient but the fruit will keep best over a dirt floor.

We were unable to figure definitely what our storage plant cost as a large part of our expense went for packing room, office and equipment. Thirty cents per bushel capacity would be a liberal estimate. This includes insulating the walls, the composition board, ventilators, chutes, stucco fabric and plaster and new slate shingle for the roof. In the light of commercial cold storage rates the economy of such a farm storage is very apparent.

Success of the storage is largely dependent on careful attention to its operation. Ten days before we expect to store fruit we begin to lower the temperature within the storage as much as possible, taking advantage of any cool nights by opening all the vents and closing them when the outside temperature rises to that inside. We use bushel crates for storing the apples, filling them in the orchard, drawing them to the storage with wagons or trucks and stacking them ten high and in blocks of one variety. As much as possible we put the fruit into storage in the morning, having it on the trucks or in the field over night and storing early while still cool. The storage temperature can be maintained or even lowered in this way, while storing during the heat of the day will often increase it above the average outside temperature. On each side of the storage is a small service door at a convenient level with trucks and wagons, through which the fruit is rolled on a gravity conveyor to the place where it is stacked. This eliminates opening and closing of the large doors. The same conveyor is used for moving the fruit from the stacks to the packing room later in the season. Whenever the outside temperature is below that inside the vents are opened; when the reverse is true they are closed until a temperature of 32 to 34 degrees is reached. When this temperature is reached the vents are opened whenever the outside temperature will not change that inside.

Every storage presents a different problem and its construction depends on the grower's needs. In addition to the three requirements of insulation, ventilation and humidity it should be reasonably fire proof, rat and vermine proof, above ground and located conveniently to the orchard and highway. Careful planning of construction or a slight expense for equipment will often save many times the cost over the years for which a storage is built. To the grower who stores twenty-five hundred bushels or more I know of no better way of cutting the cost of production than by the cool air storage on the farm. It is really not a question of, "Can I afford it?" but rather, "Can I afford to be without it?"

Artificial "Weather" to Aid in Insect Control Study

ARTIFICIAL winter weather, ranging from a mild day to 30 degrees below zero, has been reproduced in a laboratory at the Massachusetts Institute of Technology for studying the effect of low temperatures on certain insects which cause great losses in forest and orchard.

This man-made weather, which in a period of five days ran the gamut of an old-fashioned New England winter, was produced in a specially constructed room in the department of physics under the direction of Prof. Gordon B. Wilkes. The undertaking was carried out in co-operation with the Bureau of Entomology of the United States Department of Agriculture, which has a laboratory at Melrose.

As a result of this experiment, which is part of a scientific campaign to prevent further spread of insect pests, the entomologists of the bureau hope it will be possible to forecast relative abundance of some of these insects following severe winters. The tests are also expected to determine definitely the temperatures fatal to the hibernating forms of the insects treated.

Some 120,000 eggs of the gipsy moth, which attacks forest and shade trees, 35,000 larvae of the brown-tail moth, which damages fruit and shade trees, 400 webs of the satin moth, an insect which defoliates and sometimes kills poplars and willows, and 400 cocoons of the oriental moth, an enemy of fruit trees, were used in the tests. All of these insects have been accidentally introduced into the United States from foreign countries.

In order to compare results of the experiments, several species of native insects were given the same treatment. These included 40,000 eggs of the eastern or apple tree tent caterpillar, about 12,000 eggs of the forest tent caterpillar, some 25,000 eggs of the tussock moth, and 80 cocoons of the promethea moth. In addition to these insect pests, 40 lots of Apanteles, a beneficial insect and an enemy of many of the injurious species, were studied to determine the limits of its working range in the New England climate.

On the first day of the experiment, the chamber containing the insect specimens, all of which were in the hibernating form, the stage in which the insect usually passes the winter, was cooled to a temperature slightly lower than that prevailing outdoors on that day. Each succeeding day the temperature was brought still lower, until, on the fifth day, thermometers in the room registered 30 degrees below zero.

The process, however, was not a continuous and steady loss of heat, or lowering of temperature. As such conditions never occur in nature, the greatest care was exercised to stimulate natural conditions as closely as possible. This was accomplished by slowly lowering the temperature to reproduce the conditions of night and allowing it to rise as it does in nature during the day.

Damson Plums Deserve Growers' Consideration

DAMSONS possess many qualities which should commend them to fruit growers, particularly for home consumption and for local markets, declares Dr. U. P. Hedrick, horticulturist at the experiment station at Geneva, N. Y., who believes that this fruit is not receiving the attention in this country that it deserves. Abroad, the Damson is in great demand for canning, preserving, tarts, etc., and is much better known, says Dr. Hedrick.

All European plums are divided into two groups, the Domesticas, to which belong the large-fruited varieties, and the Damsons. The recorded history of the Damsons goes back 600 years B. C. to the city of Damascus where the Damson or Damask plum is believed to have originated.

Damsons surpass all European plums in productiveness, vigor of tree, and hardiness, says Dr. Hedrick. The fruits are smaller and more astringent than those of the common cultivated plums, and for this reason the Damsons have never been so popular as the Domesticas. For culinary purposes, however, they are unsurpassed.

Shropshire is the best known Damson in this country. French is also a common variety and has larger and more productive trees than Shropshire. The fruit of the French is also larger, handsomer, and may be eaten out of hand when fully ripe. French is believed to be a cross between Shropshire and some Domestica variety.

Another excellent Damson is Mirabelle. There are several Mirabelles in Europe, but because of their small size they have never found much favor in America. The experiment station is introducing an "American Mirabelle" which is larger than the common Mirabelle with round yellow fruit having a sweet, pleasing flavor. The trees of the new variety are small but extremely vigorous and hardy.

Old Peaches Lose Appeal

THE EARLY ripening varieties of peaches now grown in New Jersey and in the North Atlantic states, are proving unprofitable to growers, according to various observers. The earliest varieties to ripen are clingstones and are not of sufficiently high quality and attractiveness to appeal to consumers.

Foreseeing this situation, the horticultural department of the New Jersey Agricultural Experiment Station, New Brunswick, began breeding better varieties of peaches in 1914. From this has been developed a yellow freestone ripening early in August and called Golden Jubilee because of having ripened for the first time on the fiftieth anniversary of the founding of the New Jersey State Horticultural Society. More than 12,000 trees of this new variety were distributed to New Jersey peach growers in the fall of 1927, and New Jersey nurserymen have about 40,000 trees growing in their nurseries, preparatory to distributing them this fall. The variety is already attracting attention as far south as Georgia. The following is an extract from a letter recently received by M. A. Blake, chief in horticulture at the New Jersey station, from a peach grower in Macon, Ga.: "Would it be possible for you to ship us one bushel or crate of the Golden Jubilee peaches when they are ready? Ship these by express c.o.d. regardless of price as we are anxious to see this peach and how it carries as we anticipate trying this variety in a commercial orchard this fall."

August Patterns

No. 201—Smartly Styled.
Designed for sizes 16, 18 and 20 years, 36, 38, 40 and 42 inches bust measure. Size 36 requires 3¾ yards of 40-inch material with ½ yard of 32-inch contrasting.

No. 860—Slenderizing in Effect.
Designed for sizes 36, 38, 40, 42 44 and 46 inches bust measure. Size 36 requires 3½ yards of 40-inch material with 1 yard of 40-inch contrasting.

No. 190—One-Piece Wrap Around.
Designed for sizes 16, 18 and 20 years, 36, 38, 40 and 42 inches bust measure. Size 36 requires 2⅞ yards of 40-inch material with 4¼ yards of piping or braid.

No. 138—Unusual One-Piece Type.
Designed for sizes 16, 18 and 20 years, 36, 38, 40, 42, 44 and 46 inches bust measure. Size 36 requires 3¾ yards of 40-inch material with ⅝ yard of 27-inch contrasting.

No. 965—Cunning Bloomer Dress.
Designed for sizes 2, 4 and 6 years. Size 4 requires 2¼ yards of 36-inch material.

No. 216—Cool Looking.
Designed for sizes 6, 8, 10, 12 and 14 years. Size 8 requires 1⅞ yards of 32 or 36-inch material with ¼ yard of 32-inch contrasting.

No. 150—All-Occasion Dress.
Designed for sizes 16, 18 and 20 years, 36, 38, 40, 42, 44 and 46 inches bust measure. Size 36 requires 3¼ yards of 40-inch material with ¼ yard of 20-inch contrasting and 1¾ yards of binding.

No. 147—For the Busy Woman.
Designed for sizes 16, 18 and 20 years, 36, 38, 40 and 42 inches bust measure. Size 36 requires 3 yards of 40-inch material with 5 yards of binding.

Embroidery No. 730—Narrow Border.
Pattern includes 5 yards of each band. Suitable for dresses, luncheon sets, towel ends, etc. (Blue and yellow.)

Patterns may be secured by mail, at 10 cents each, postpaid, from AMERICAN FRUIT GROWER MAGAZINE PATTERN SERVICE, 22 East 18th St., New York.

American Fruit Grower Magazine for August

A Survey of the Apple Market Needed

THE PROFITABLE marketing of any commodity can be greatly assisted if all available information concerning the possible market is gathered and studied. No manufacturer would consider inaugurating a selling campaign for any product without first obtaining all possible information as to the probable demand for the product. Such information, when gathered, compiled and classified, is generally termed a "Market Survey" or "Market Analysis."

That the marketing of the apple crop would be aided by a comprehensive survey cannot be denied, as the information thus secured would furnish a solid basis upon which to build some orderly plan for marketing the apple crop, with the end in view of securing to the grower the utmost profit for his crop.

An anlysis should be made of apple price fluctuations over a period of years, compared with the supply of apples over the same years.

The country easily divides itself into districts or areas that are naturally tributary to large distributing or "jobbing" centers. We naturally think and speak of the "Pittsburgh district," the "Buffalo district," the "Chicago area," etc. And there are many others. The market or demand for apples should be studied by districts, as conditions differ in each jobbing or distributing area.

A comprehensive, business-like survey would determine the favorite varieties in each section, for desert and for cooking; the possible market for by-products, such as apple juice, apple jelly, jam, etc., and the varieties best adapted to such purposes.

The areas of high and low apple consumption would be discovered, and methods suggested for overcoming low consumption.

A survey of available storage facilities would serve as an aid in the orderly marketing of the crop, though it is becoming evident that every grower with ten or more acres of winter apples will benefit by having available farm storage. But this, too, is a point that a survey would determine to a certainty.

The suitability of various packages should be investigated. Manifestly the apple package suitable for the western ranch house is distinctly unsuitable for the metropolitan apartment. It is generally conceded that no package has been adopted in general use that will properly display well colored apples and at the same time serve as a "consumer package" for delivery to the city apartment.

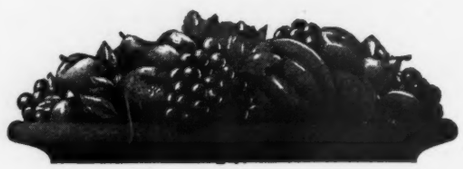
These are but a few of the more important lines of investigation that naturally suggest themselves. There are many others. All this information is available and can be secured. It is simply a question as to how to pay for securing it.

Other similar surveys have been made, with profitable results. The pineapple industry of Hawaii, once a most hazardous, and now a most profitable industry, owes its change in status to a survey of the pineapple market. In this case the survey showed the necessity of practically revolutionizing the marketing methods, and the Hawaiian pineapple now goes to market in a tin can.

It is not to be thought that a survey of the apple market would result in any such departure from established marketing methods, but that there is room for vast improvement in disposing of the apple crop permits of no argument.

It is the cost of a survey of this kind that at first glance might appear to make the project impossible. An adequate survey might cost $50,000. It might cost more. Several of the larger advertising agencies are equipped to handle a survey of this kind, and given the time and the money, would be able to hand the apple industry a supply of compiled information that would be priceless. It could be made to form the basis of a comprehensive campaign that could easily tripple the consumption of apples.

A project of this kind would need the sponsorship of some national organization that could raise the necessary funds to defray its cost, and that could put the results of the survey to practical use. We commend the idea to the consideration of the American Apple Shippers' Association.



In This Issue

Fruit Storage a Live Issue

IN THIS ISSUE appears the first of a series of articles on fruit storage, which will be followed by others, from time to time. That some method of fruit storage is needed on every fruit farm of commercial size is becoming more evident every year. In the season of 1926, with its general full apple crop, those growers who were able to hold their apples and market them during the early part of 1927 were not noticeably embarrassed by the large supplies. The growers who were able to store even part of the short crop of 1927 realized heavily on their investment in farm storage.

This season, with its very general promise of a good crop, brings the subject of farm storage again to the front. Some of the outstanding advantages of farm storage are graphically described in the article in this issue. It is a subject that the commercial grower should gravely consider. And after considering he will act.

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